School Shop

vol. XXI no. 4
DECEMBER 1961

The Survey
by Robert Jacoby and B. J. Novak

Inventions and Patents
by Robert Irving

Two Talented Boys
by Franklin J. Keller

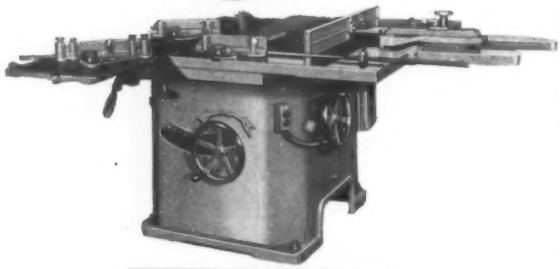
Cover Story: An instructor and students at Orange Coast College, Costa Mesa, Calif., studying parts in a laboratory where young men learn to repair data-processing instruments. For another special TECH-ED report, turn to page 33.

UNIV.MICROFILMS
313 N.1ST ST.
ANN ARBOR,MICH.-COMP

21 YEARS OF SERVICE TO TEACHERS OF INDUSTRIAL EDUCATION

You'll like *Northfield* woodworking machines in YOUR school shop!

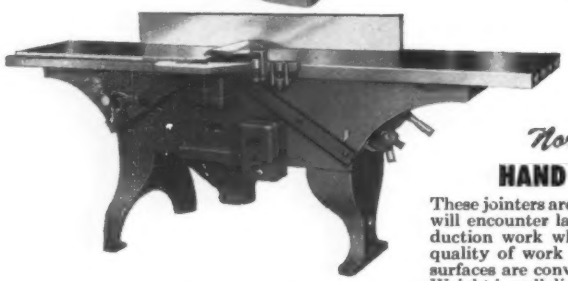
You'll like them for their heavy, vibration-free, smooth running. Each machine is electronically balanced. You'll like their dependability, the freedom from trouble, their excellent safety features. And yes, you'll like the price too. Take all these factors into consideration and compare NORTHFIELD with any others before you buy.



The Northfield NO. 4 VARIETY SAW

Tilting Arbor Type

The NORTHFIELD No. 4 Variety Saw is a carefully designed, quality machine with the latest features. It offers maximum versatility for all around sawing in any school shop. In addition to wood it's adaptable for cutting light metals, plastics, and other materials. The table on the basic machine is 44″ x 36″, plus a 19½″ extension for carrying the rip gauge table. One or more 12″ table extensions can be furnished to increase table size. A rolling section table is also available. You'll like this machine for its versatility, heavy duty capacity, ease of handling, and speed with precision.



Northfield HAND JOINTERS

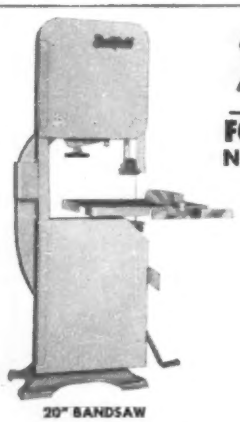
These jointers are of the type the student will encounter later being used for production work where accuracy and fine quality of work are essential. Working surfaces are convenient to the operator. Weight is well distributed to make a well balanced smooth operating machine. The medium duty machine at right is available in eight and twelve inch widths. Tables are 6′2″ long; rabbet depth ⅜″. Heavy duty jointers are available in 12″ and 16″ sizes. Tables are 8′ long; rabbet depth ⅝″. They use a round three or four knife, safety type cylinder head, and a three horsepower, 3600 R.P.M. T.E.F.C. motor; five H.P. motors and belt drive machines also available.

WRITE TODAY FOR LITERATURE AND PRICES

Northfield

FOUNDRY & MACHINE CO.

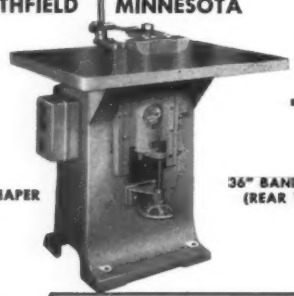
NORTHFIELD MINNESOTA



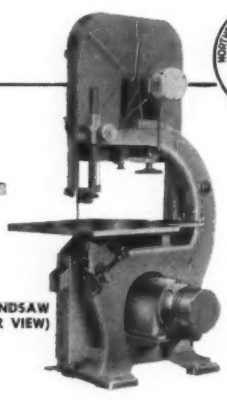
20″ BANDSAW

Northfield BAND SAWS

are available in 20″, 27″, 32″ and 36″ sizes. The 20″ band saw takes 24″ x 36″ in floor space, horizontal capacity is 20″, vertical capacity under guide is 11″.

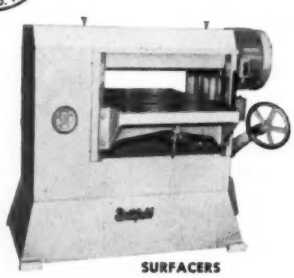


SHAPER



36″ BANDSAW (REAR VIEW)

Manufacturers of High Speed Precision Heavy Duty Woodworking Equipment



SURFACERS

Northfield SURFACERS

are ideal for school shops. They have simplified, high performance, trouble-free, mechanical design. They are available in 18″ x 8″, 24″ x 6″, and 25″ x 9″ sizes.

School Shop

Editor and Publisher
Lawrence W. Prakken

Chairman, Editorial Board
Thomas Diamond

Managing Editor
Oliver E. Hanninen

Associate Editor
Jerome C. Patterson

Assistant Editor
Burley L. Hendricks

Washington Consulting Editor
Michael Paca

Advertising Sales Manager
Roy A. Carpenter

Advertising Production Manager
Dorothy J. Buffington

Circulation Manager
Kenneth C. MacAdam

•

EDITORIAL ADVISORY BOARD

Russell K. Britton, Administrative Director, Division of Instructional Services, Denver, Colorado, Public Schools.
Walter C. Brown, Director of Vocational-Technical Education and Supervisor of Industrial Arts, Public Schools, Phoenix, Arizona.
Rupert N. Evans, Associate Dean, College of Education, University of Illinois, Urbana.
L. Lawton Gore, Professor of Industrial Education, George Peabody College for Teachers, Nashville, Tennessee.
J. F. Ingram, Director, Vocational Education, State Department of Education, Montgomery, Alabama.
John A. Jarvis, Dean, School of Industrial Education, Stout State College, Menomonie, Wisconsin.
Albert E. Jochen, Assistant Commissioner of Education, Vocational Division, New Jersey State Department of Education, Trenton.
E. L. Kurth, Assistant Director, Vocational and Adult Program Planning and Coordination, Florida State Department of Education, Tallahassee.
William R. Mason, Supervisor, Industrial Arts, Board of Education, Cleveland, Ohio.
C. Thomas Olivo, Chief, Bureau of Vocational Curriculum Development and Industrial Teacher Training, State Education Department, Albany, New York.
W. D. Purvine, Director, Oregon Technical Institute Klamath Falls, Oregon.
Lee W. Ralston, Director, Division of Practical Arts Education, Los Angeles County Schools, California.

MEMBER OF

EDUCATIONAL PRESS ASSOCIATION OF AMERICA

CONTENTS

The Survey: A Major Tool in Vocational Planning Robert Jacoby and B. J. Novak 9
The changes going on continually demand that a careful watch be kept of them.

Teaching Developments . . . . . Stanford D. Ruggles 11
This method of teaching developments will help students understand them more easily.

Candlestick Holder . . . . . Edward C. Klee 12
Ideal for elementary patternmaking, they are a fine Christmas project.

A Panel to Teach R-C Constant . . . . . Isaac P. Hampton 13
A nifty teaching aid for your electricity classes.

Inventions and Patents . . . . . Robert Irving 14
For the young inventors in your classes.

Snow Scooter . . . . . Uno A. Suomela 15
It's that time of year when this project in wood should be appealing.

Anchored Drill-Press Vise . . . . . Lewis J. Jenkins 16
This accessory item should increase the safety factor of your drill press.

Tape Dispenser . . . . . Arthur F. Schuster 18
It's simple, it's rugged, and it's handy.

Two Talented Boys . . . . . Franklin J. Keller 25
A tale of two boys gleaned on a national survey of industrial education.

TECH-ED SECTION 33-36

ATEA Program Highlighted 33
And other news of interest.

Technical Education in Washington . . . Ralph E. Dever 34
"Over-the-shoulder" is just not enough.

REGULAR FEATURES

School Shop Talk 2
Kennedy's Committee.

In the Morning Mail 4
Comments from Readers.

Diamond Dust Thomas Diamond 20
Work! Can You Beat It?

News 22
Happenings in industrial education.

Strictly Personal 24
About your fellow teachers.

Speaking of Design . Aarre K. Lahti 30
"You don't have to agree . . ."

Instructional Resources . . 38
The latest in books, pamphlets, and visual aids.

News from Industry 42
News products and teaching aids.

Index to Advertisers 51
Check the numbers on the card to get additional information.

From Washington Theodor Schuchat 52
News from the Nation's Capital.

December 1961 **Vol. XXI, No. 4**

PRAKKEN PUBLICATIONS

Editorial and Business Office: 416 Longshore Drive, Ann Arbor, Michigan.
Manuscript Information: Manuscripts are paid for on publication and should be addressed to the Editor, School Shop, 416 Longshore Drive, Ann Arbor, Michigan.
Subscription Rates: $3.00 a year; Canadian, $3.00 a year; foreign, $4.00 a year. Single copies, 40 cents each except April which is 50 cents. Special group rates for students in teacher-training institutions will be given on application.
Publication Information: Published monthly, September through June, at Barrington, Illinois. Printed in the United States of America. Copyright 1961 by Lawrence W. Prakken. Member, Business Publications Audit, Inc.

Advertising Sales Offices:
Ann Arbor, Mich.—416 Longshore Drive, telephone Area Code 313 — 668-7205.
Chicago 45, Ill.—Didier & Broderick, Inc., 5809 Lincoln Ave., telephone LOngbeach 1-5284.
New York 17, N. Y.—Macintyre-Simpson & Woods, 101 Park Ave., telephone LExington 2-0020.
Los Angeles 5, Calif.—The Jess M. Laughlin Company, 711 South Vermont Ave., telephone DUnkirk 3-7697.
San Francisco 4, Calif.—The Jess M. Laughlin Company, 465 California, telephone EXbrook 2-4050.
Postal Information: Accepted as controlled circulation publication and postpaid at Barrington, Illinois, and at Ann Arbor, Michigan.

AMERICAN TECH

Publishers since 1898...

Up-to-the-Minute Texts for Your February Classes!

1. Automotive Fundamentals

2nd Edition, Venk-Billiet

This completely revised edition provides a one year comprehensive training program. Thorough coverage of maintenance, operation, and basic repair of all units of the modern car has been incorporated. Particular emphasis has been placed upon the servicing aspects of each of these units. Color has been used throughout the text to illustrate complex action.

520 pages. Over 580 illus. $6.50

2. Interior Electric Wiring —Part I, Residential

6th Edition, Kennard C. Graham

A new edition of a book which has attained an enviable reputation for its thorough coverage of job-tested practices. This is not just a How To Book. Not only does it illustrate practical wiring procedures, but it also stresses such factors as wiring safety, alternative wiring methods, designs and estimating. This new edition is based on the latest revision of National Electric Code. Considerations have been given to such modern conveniences as refrigerators, built-in-appliances, furnaces, and the many problems arising therefrom.

312 pages. 253 illus. $4.75

3. Psychology for Life Today

2nd Edition, Charles R. Foster

Formerly titled *Psychology for Life Adjustment* . . . this thoroughly new and enlarged edition furnishes the reader, in non-technical language, with the most recent developments in Psychology and applies them to everyday life. It is designed to provide the reader with a more adequate understanding of his own behavior as well as that of others.

4. Handbook For Technical Writers

Jennings-Tracy

This book is bound to be the technical writers' most valuable aid in training the future technical writer. It first examines in detail the report writing function. Then it deals individually with the various aspects of technical writing. Detailed instructions are given for dealing with format, style, and the mechanics of preparing reports. A special section discusses the handling of classified material. A glossary and a section on abbreviations are also included.

134 pages. Well illus. $3.50

SEND FOR ON-APPROVAL COPIES

TEAR OUT AND MAIL TODAY

American Technical Society
Dept. W-447
848 E. 58th Street, Chicago 37, Ill.

Please send me on-approval copies of textbooks checked below. After as long as 10 days of leisurely examination, I agree to either return them, or make remittance—less educator's discount.

1 2 3 4

Name_____
Subject/Position_____
School_____
Address_____
City_____ Zone____ State_____

School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Kennedy's Committee on Vocational-Education Legislation

In the "From Washington" columns of this issue of SCHOOL SHOP you will find the announcement of the appointment of the committee by President Kennedy which has been asked "to review and evaluate the National Vocation Education Act and make recommendations for improving and redirecting the program."

Vocational educators have been looking forward with great interest to this announcement as the make-up of this group could have a profound effect on its findings and ultimately on the federal legislation which has sparked vocational programs through the years.

As you will note from running down the list of appointees, 9 of the 26 members of the committee are persons with direct responsibilities for vocational-education programs. Two more are administratively responsible for vocational education, one as a state superintendent of public instruction and the other as a city superintendent who is also chairman of the group.

The other 15 members of the committee represent labor, industry, and the lay public. The chairman, Benjamin Willis, superintendent of the Chicago public schools, has long been a thoughtful and vigorous supporter of vocational education. In fact, he has been making a careful study of the program in his own school system for some time.

The complexion of this committee indicates that it will make a realistic and progressive study of the Smith-Hughes and George-Barden Acts and related legislation. It is well larded with individuals from without vocational education who should bring to the deliberations the fresh and stimulating viewpoints so necessary to an adequate reappraisal.

The committee's report is due about a year from now. The Administration will probably suggest to Congress changes in the vocational-education acts which will be based on the committee's report.

The Smith-Hughes and George-Barden Acts are not sacrosanct. Plenty of water has gone over the dam since they were passed. Nevertheless the primary reason for the passage of the Smith-Hughes Act 34 years ago—"to provide for the promotion of vocational education"—exists as much today as it did then. While much has been accomplished in the promotion of vocational education, the job to be done now and in the immediate future looms large as our technology advances and the need for trained manpower seems to reach no end.

Briefly, here are some of the questions that need answering and which could involve changes in the vocational-education acts:

► Should vocational-education courses be more general, covering families of occupations rather than a specific trade skill area?

► What can be done to provide more trade and industry education for women who are increasingly entering the employment field?

► How can the problem of providing vocational education for students in the smaller school systems with limited facilities and numbers of students be met more adequately?

► Should the acts be liberalized so that the administration of them could be more elastic and fluid, rather than rigid and standardized?

► What are likely to be the areas in which a greater emphasis needs to be placed in contrast to the present vocational-education program emphasis?

► What can be done to give status to vocational-education programs so that they will attract capable students and be considered scholastically acceptable by counselors and school administrators?

► How can counselors and guidance people be stimulated to develop a greater understanding of occupational opportunities in the trades and industries?

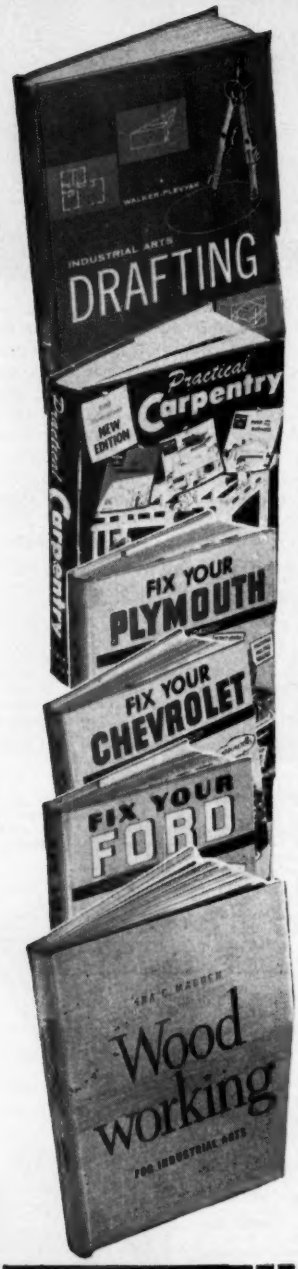
The above are just a few of the areas that no doubt will be considered by the committee before it makes its report. We expect that it will seek the advice and counsel of consultants from both within and without vocational education while carrying out its assignment.

The report of the President's Advisory Committee will be awaited with great interest by all of us. It has an opportunity to stimulate wide public as well as professional attention to vocational education. We wish it well.—*L.W.P.*

"HOW-TO" TEXTS

AUTHORITATIVE
Up-To-Date!

GOODHEART WILLCOX



G-W "TEACHING TEXTS" are used by thousands of schools. Every month their demand increases.

Check books you would like to examine and MAIL TODAY!

- ☐ **INDUSTRIAL ARTS DRAFTING by Walker & Plevyak.** A well-rounded first or exploratory course. Revitalizes drafting by teaching it as a Language of Symbols used in Creative Thinking, Planning. Extra color stimulates student interest, makes important fundamentals easy-to-understand $3.75
- ☐ **WOODWORKING FOR INDUSTRIAL ARTS by Ira C. Madden.** Supplies basic knowledge about tools, woods and finishing materials used in productive shop work. Provides a wide selection of projects. Over 250 illustrations... $4.00
- ☐ **MOTOR SERVICE'S AUTOMOTIVE ENCYCLOPEDIA by Toboldt & Purvis.** Greatest book available for teaching students Fundamental Principles and Basic Service Procedures — the foundation for sound, thorough knowledge of auto mechanics..... $7.95
- ☐ **PRACTICAL CARPENTRY by Mix & Cirou.** Used by over one thousand schools. Written and illustrated so beginners understand best carpentry practices. 4-Color insert identifies 32 different woods. Over 1100 illustrations.. $5.00
- ☐ **MODERN REFRIGERATION & AIR CONDITIONING by Althouse & Turnquist.** Basic Fundamentals, Principles, Applications of all Refrigerating mechanisms and their components $7.45
- ☐ **MODERN WELDING PRACTICE by Althouse & Turnquist.** Welding, metal cutting, heat treating taught in non-technical form. Unbiased coverage of the entire welding field $5.00
- ☐ **PAINTING & DECORATING ENCYCLOPEDIA by Wm. Don Jarvis.** A one volume library of modern "know how" on painting, decorating and wood finishing. Perfect for apprentices, vocational students, professionals..... $5.45
- ☐ **COPE'S PLASTIC BOOK by D. W. Cope.** Best ways to saw, machine, polish form, cement, plastics. Over 90 practical, colorful projects..... $4.50
- ☐ **ALL ABOUT SMALL GAS ENGINES**..... $4.50
- ☐ **ALL ABOUT HOUSE WIRING**..... 2.50
- ☐ **FIX YOUR FORD**..... 2.95
- ☐ **FIX YOUR CHEVROLET**..... 2.95
- ☐ **FIX YOUR PLYMOUTH**..... 2.95
- ☐ **FIX YOUR VOLKSWAGEN**..... 2.95
- ☐ **103 EASY JIG SAW PROJECTS**..... 1.50
- ☐ **72 BIRD HOUSES & FEEDERS You Can Make**... 1.50
- ☐ **95 PLYWOOD PROJECTS**..... 1.50
- ☐ **PROJECTS FOR METALS**..... 1.75
- ☐ **VOCATIONAL MATHEMATICS (Shop Arithmetic)**. 1.50
- ☐ **VOCATIONAL MATHEMATICS (Shop Geometry, Algebra, Trigonometry)** 1.75

25% Discount TO SCHOOLS, TEACHERS

GOODHEART-WILLCOX CO. — **30 DAYS EXAMINATION**

1322 S. Wabash, Dept. 92, Chicago 5

Please send me on 30 days approval, examination copies of books I have indicated, checking the squares above.

Name ..... School .....

Street .....

City & State .....

Publishers of Topnotch Texts since 1921

Teach Your Students with the Very Best . . .

American Beauty Soldering Tools

No. 3120-SC
3/16" TIP
30
WATTS

No. 3125
1/4" TIP
60
WATTS

No. 3138
3/8" TIP
100
WATTS

Train them with the tools they will use on the jobs of tomorrow.

American Beauty has the right model—with the correct tip size and proper wattage—to do any soldering job quickly, properly and efficiently. **American Beauty** soldering irons have been serving industry since 1894—and continue to set the pace for ever-changing requirements. Give your students the advantage of learning with these fine up-to-date tools . . . they will learn best with highest quality **American Beauty** soldering irons. Write for 16-page illustrated catalog containing full information on our complete line of electric soldering irons—including their use and care.

A special educational discount is available, see your distributor.

AMERICAN ELECTRICAL HEATER CO. DETROIT 2, MICHIGAN

IN THE MORNING MAIL . . .

(Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

About the "Merger" . . .

Dear Sir:

I would like to speak out in general support of Ray Larson's position concerning the formation of a single professional organization for industrial-arts teachers (SCHOOL SHOP. October, 1961, pp. 4 and 74).

I heartily agree with Ray's view of industrial arts as an area of general education. It is difficult for me to justify any high-school, industrial-arts program which is not general in nature. At the junior-high-school level, such a program cannot be justified.

Perhaps our feverish preoccupation with industry and its interpretation to students has led us to embrace the philosophy and methodology of vocational education to the present unfortunate extent. Industrial arts is concerned with tools and materials. So is vocational education. There, in large part, the parallel ends. Parenthetically, I do not believe that industrial arts can always, or even often, interpret industry successfully. In any case, developing an understanding of industry is but one of many objectives, and it may not be our most important task.

It seems that the approach which arts people have taken—emphasis on design, creativity, and problem-solving, a permissive learning atmosphere, enjoyment of work with materials, and an abhorrence of teaching "by the numbers"—has much meaning to industrial arts.

If we attempt to develop a new professional organization, the good of the field, not the benefit of the exhibitors or the convenience of members who find it unhandy to attend two meetings per year, should guide our efforts. Exhibitors, after all, are not compelled to exhibit, and members may elect not to attend both meetings.

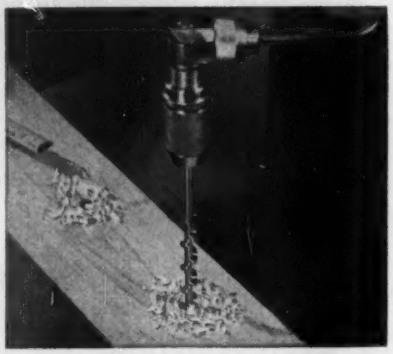
I think we should have one professional organization which would enlist the active support of industrial-arts teachers at all levels, not chiefly college professors—especially department heads—and state department personnel, as is largely the case at present. Such an organization might well operate through the media of monthly, state, regional, round-table meetings, yearly state conventions, and one yearly national convention. The state regional groups and the state organizations should be affiliates of the national organization, and a unified dues procedure should be utilized.

The American Industrial Arts Association, a department of the National Education Association, is well known nationally and is the logical organization to be expanded along the lines I have suggested. I see little reason for the continued existence of the industrial-arts section of the American Vocational Association, except to provide a second yearly convention for those who can afford the time and the money to attend.

We have much to gain from making a unified effort, through a strong professional organization, to improve the quality of industrial arts. We should not remain divided.

Robert D. Brown,
Associate Professor of Industrial Arts
Northern Illinois University,
DeKalb, Ill.

IRWIN Wood-Boring Tools help get school shop projects done on time

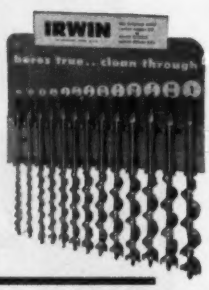


The faster, cleaner, always accurate boring action of Irwin wood boring tools saves time and materials, steps up class room efficiency. Projects get done on time. The quality of the finished job stimulates student interest and appreciation of good workmanship. And replacement costs are lower, too. Irwin wood-boring tools are made to last much longer. Put Irwin to work in your shop and see. Order from your school shop jobber or independent hardware dealer.

IRWIN SPEEDBOR "88"
New spade type electric drill. Does more work with less power — steps up the efficiency of small ¼" electric drills and drill presses. Exclusive hollow ground point bores cleaner, faster in hard and soft woods, plywood, plaster, plastics. No wobble or run off. Size markings on head. Hang-A-Bit hole for storing on nail or pin. Sizes ¼" to 1½" and sets.

62T BORCHEST SET
America's most popular School Shop set. 13 Irwin 62T hand brace type bits in hand-rubbed hardwood box, sizes ¼" to 1". Medium fast screw pitch makes the Irwin 62T ideal for all-purpose boring in most any wood. Double cutter action, solid center design, hardened full length for longer life. Each bit highly polished. Also available in individual sizes and plastic roll sets.

D-13 SCHOOL SHOP SPECIAL
Irwin storage rack and bit set. A convenient combination of 13 Irwin 62T wood auger bits and small space storage rack. Patented spring steel clips hold bits in place. Hole sizes make selection sure and easy. Steel rack fits 8" x 10¼" area and screws easily to wall or bench. Boring range of 13 bits, ¼" to 1".



Write for Free Irwin Catalog No. 53. Makes ideal reference guide.

IRWIN
Wilmington, Ohio

the original solid center auger bit
•
screw drivers
screw driver bits

Practical drafting shortcuts the professionals use

Understandably, the high school student must be fully trained in the fundamentals of good drawing practice—some of these basic techniques involve doing the job the "hard way" for only then is the full concept fully realized.

Increasingly, secondary schools are acquainting their students with the requirements, methods and equipment that industry uses today. This involves Drafting Machines, Auto-Shift Tables, etc.

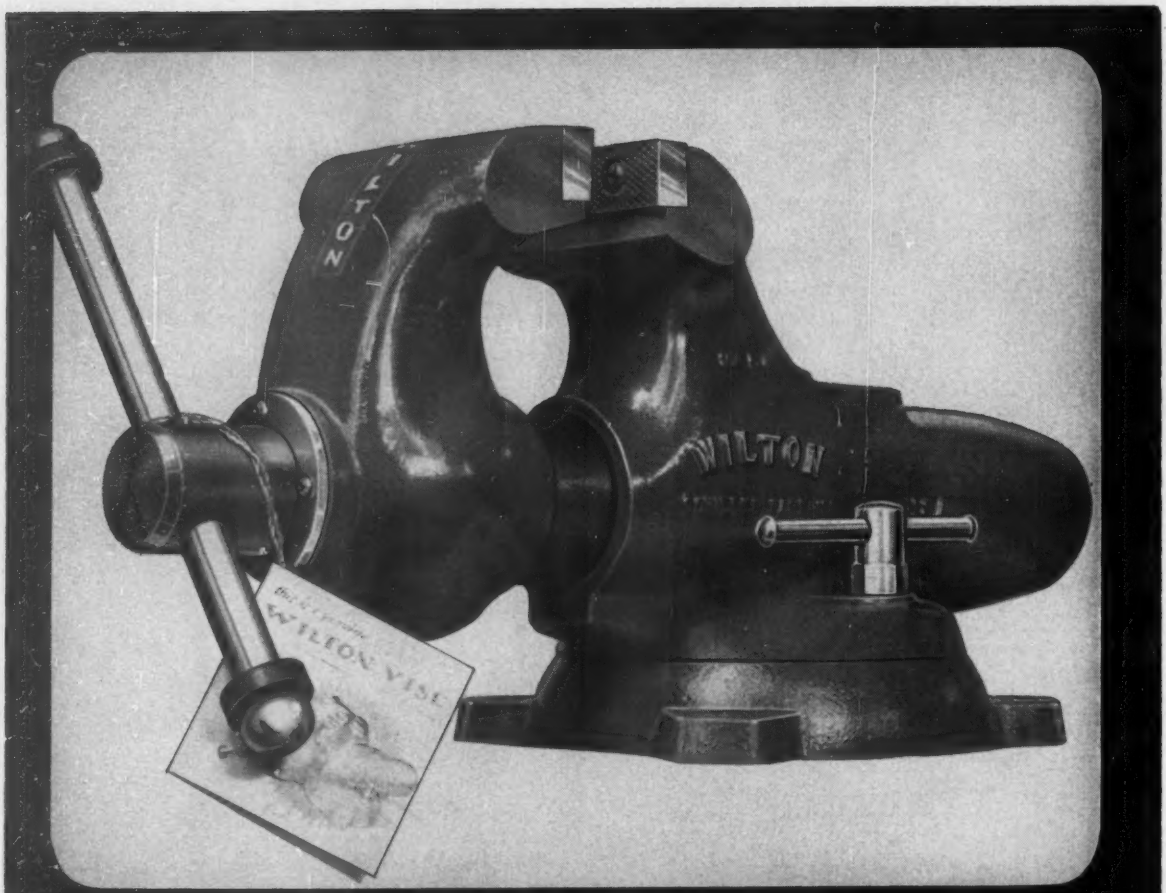
One of the tools you might want to examine and pass along to some of your students is a booklet Frederick Post Company published a year ago for the thousands of Draftsmen in industry. "Drafting Shortcuts" contains a total of 57 time saving tips. The ideas were submitted by professionals and judged by an impartial panel of widely recognized authorities.

Among the ingenious shortcut ideas to save drafting time are ones on such subjects as "Circumscribing Circles," "Drawing Radial Lines," "Ruling Lines of Equal Length" and 25 more. In the section titled "Board Time Savers," you will find illustrated "Handy Pen Point Holder," "Erasing Circles," etc. Another section is headed "Engineering Data Tips" and "Calculating Ideas."

If you think your students are ready for tips of this type, send a request on a school letterhead for a limited number of "Drafting Shortcuts" which will be sent no-charge. *Address Frederick Post Company, 3646 N. Avondale Avenue, Chicago 18, Illinois.*

POST

TRACING & DRAWING MEDIUMS • DRAWING INSTRUMENTS & SLIDE RULES • ENGINEERING EQUIPMENT & DRAFTING SUPPLIES • FIELD EQUIPMENT & DRAFTING FURNITURE • SENSITIZED PAPERS & CLOTHS



RUGGEDNESS

Malleable iron castings make Wilton Vises 50% stronger, size for size.
New handles and swivel locks now twice as strong!

DEPTH

Jaw depth increased as much as 35% . . . greater work holding capacity!

MAINTENANCE FREE

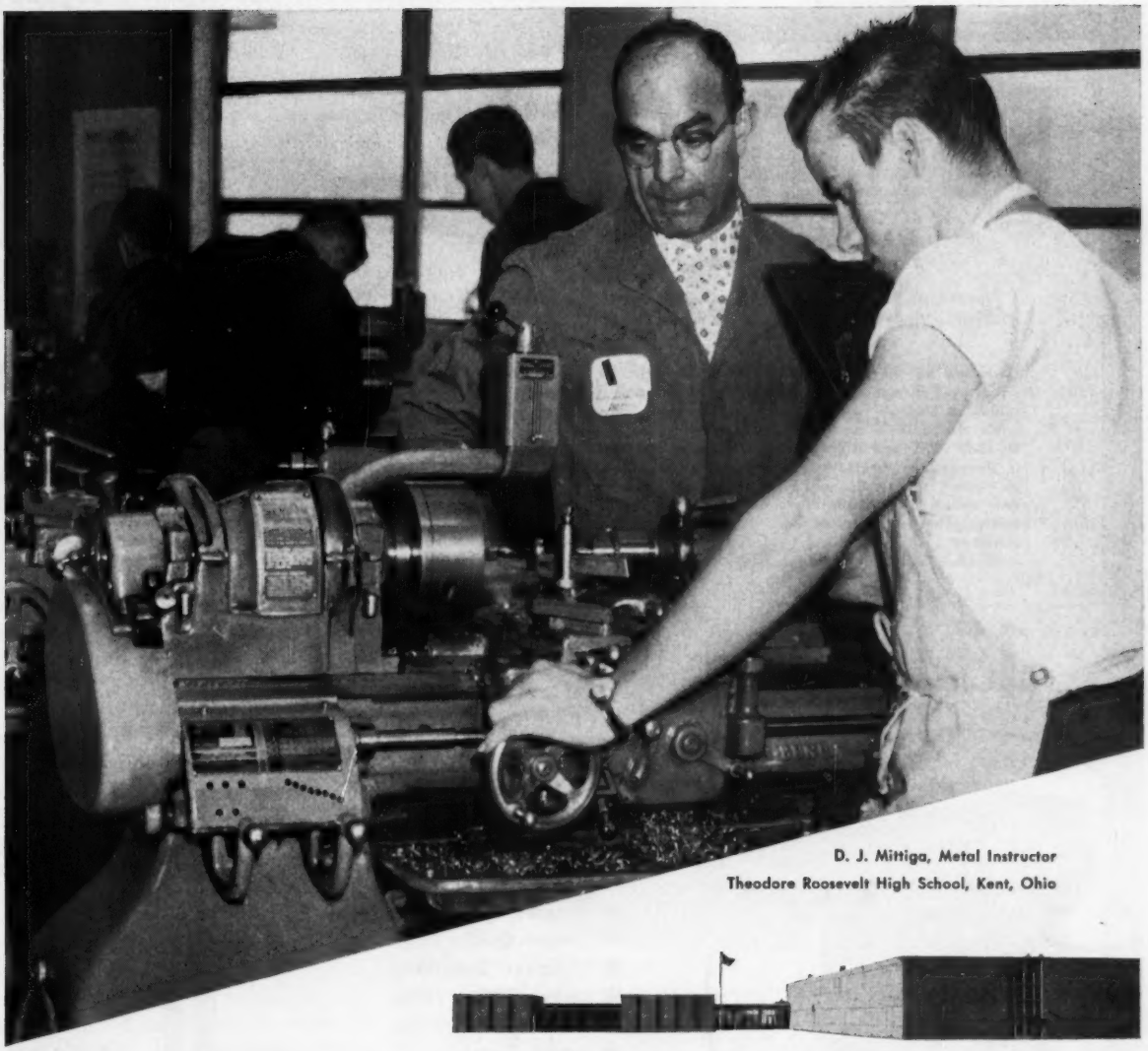
Grease is permanently sealed in for LIFETIME lubrication. Sealed body construction makes entry of grit or chips impossible.

COMPETITIVELY PRICED — UNCONDITIONALLY GUARANTEED

WILTON

WILTON TOOL MANUFACTURING CO., INC. / Schiller park, Illinois

SS-121



D. J. Mittiga, Metal Instructor
Theodore Roosevelt High School, Kent, Ohio

"South Bend has served us well..."

"We had previous experience with South Bend Lathes, so the choice for our new shop was based on a solid performance record. South Bend has served us well with quality performance and minimum maintenance." When A. J. Spangler, Chairman of Industrial Arts Department, Theodore Roosevelt High School, gave this opinion, he expressed well some of the basic reasons why schools choose South Bend Lathes. If you are planning a new shop or modernizing an old one it will pay you to write for more information about South Bend machines.

Prices of 13" Lathes start at $1759, f.o.b., South Bend.

SOUTH BEND LATHE, INC.

SOUTH BEND 22, IND.

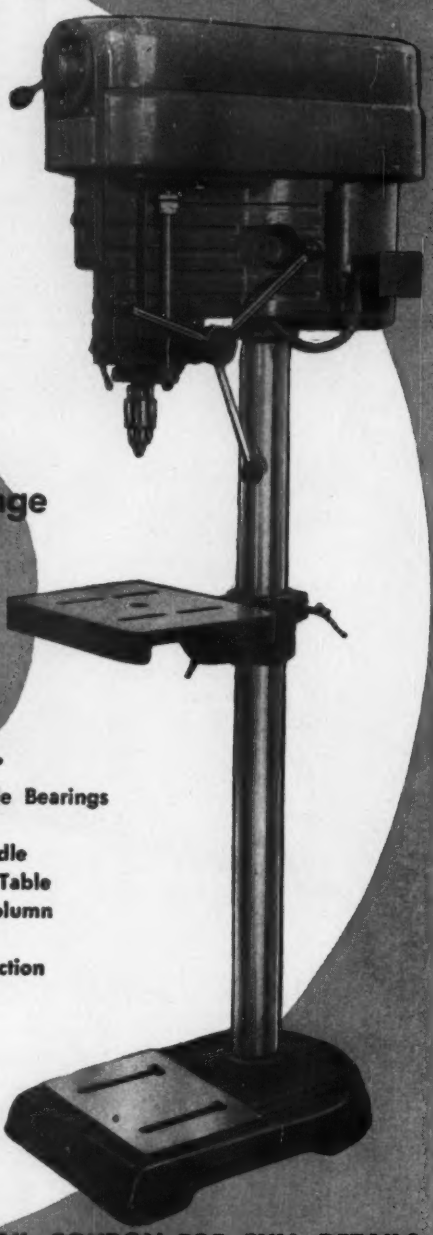
Builders of lathes • milling machines • shapers • drill presses • pedestal grinders

SOUTH BEND

Changes in our society necessitate the use of

FOREMOST

Model 1150 Drill Press



Champion of the POWERMATIC line! No belts to handle when you change spindle speed. Just twist the accurately calibrated variable speed control handle and change speed while the machine runs. With a complete speed range, 475 to 4800 RPM, and a SIX inch quill stroke, the Model 1150 is designed to meet the requirements of the high production plant. Its sturdy construction provides smoother operation under heavy work loads with maximum economy and safety. There's no need for separate Hi and Lo speed machines . . . one does the job . . . a big savings in installation and maintenance costs.

1st to offer

Complete Speed Range PLUS 6" QUILL STROKE IN ONE MACHINE

Featuring . . .

- Heavier Spindle Bearings
- Longer Quill
- 10-Spline Spindle
- Larger Tilting Table
- Heavier—3" Column
- Larger Base
- Reduced Deflection

5 SPEED STEP PULLEY

SPEEDS . . . 400 . . . 840 . . . 1580 . . . 2800 . . . 5300 RPM. Featuring cast aluminum alloy step pulleys and large guard for easier belt changing. Economy priced, it's ideal for smaller shops and schools.

MAIL COUPON FOR FULL DETAILS

Dealers in Principal Cities

POWERMATIC
Machine Company
McMINNVILLE, TENNESSEE

BAND SAWS DRILL PRESSES GRINDERS
AND FAMOUS WOODWORKING MACHINES

POWERMATIC MACHINE COMPANY,
McMinnville, Tennessee

Please rush me details on the following:

- ☐ Model 1150 Variable Speed
- ☐ Model 1150 Step Pulley
- ☐ Other (Specify)

Name_____

Address_____

City & State_____

Changes in our society necessitate the use of

The Survey: a Major Tool in Vocational Planning

By Robert Jacoby and Benjamin J. Novak

Senior Area Coordinator for Industrial Education, Pennsylvania Department of Public Instruction; and Vice-Principal, Frankford High School, Philadelphia, and Lecturer in Vocational Education, Temple University, respectively

ALTHOUGH the survey is recognized as an indispensable tool in educational planning, its use is too often slighted or overlooked. Rule-of-thumb, pressures by vested interests, "hunches," and empiricism have operated traditionally in a slower moving, less turbulent era. Rapid industrial change, population "explosions," migration, and modern legislation, e.g., the National Defense Education Act, all demand more sophisticated and efficient educational effort.

Accurate data are nowhere more essential than in projecting vocational-education offerings. Happily, more often than not, vocational planning has throughout its history relied on objective survey data, although there have been unfortunate exceptions. Well executed surveys provide a sound floor for establishing all phases of education, adult education and extension programs, as well as day offerings.

Survey and follow-up techniques are favorite topics, having strong theoretical acceptance, although limited practice, in the field of guidance. In recent years, vocational educators, along with government agencies and industrial civic planners have been perfecting and using survey techniques in their work. These now function at an improved level of efficiency. The perfection of computer and automated programing devices to accelerate the acquisition, dissemination, and analysis of data, has also encouraged more general utilization of surveys.

Surveys must be well conceived, skillfully conducted, and the data secured must be thoughtfully analyzed and carefully interpreted. It is interesting to note that in many instances surveys providing data on educational needs sponsored by persons originally hostile to vocational education have produced a radical reversal of attitude. This is a tribute to the basic fairness of people as well as to the soundness of the technique.

Every survey need not result in the establishment or implementation of an educational program. Whether or not action results, there are many secondary values. A survey cannot be conducted without involving people in the community, including employers, students, parents, teachers, governmental agencies, labor groups, state and local departments of education, and chambers of commerce. Personal contacts encouraging greater understanding among people result. A survey made in 1948 on the need for a vocational school in Trenton, N.J.,[1] had a typical advisory committee with representatives from labor, industry, public, and school administration.

Planning the Survey

Despite the increasing fluidity of the labor market, and the fact that employment complexes extend beyond urban and other political units, projection of future needs can be made with reasonable confidence. Area surveys can extend over several school districts, part of a county, an entire county, or they may involve several counties. Geographic areas are approved for survey on the basis of a preliminary survey and activities within the area, verifying the general need and desire for a more comprehensive study.

Before proceeding with direct sources of information, it is helpful to review certain secondary sources of data compiled by other agencies. Time spent in review of these secondary sources will reduce labor and misdirected effort in the collection of direct data.

Some of these secondary sources are: (1) national and local population trends from the Department of Labor; (2) labor market information; (3) industrial and civic development planning report; (4) adult occupations with current apprenticeship and other existing training facilities; (5) attitudes of civic, industrial, labor, parent, teachers, boards of education, and other groups; (6) school-population structure, including status of graduates, drop-outs, and aptitudes, interests, and achievement levels of the potential students; (7) existing curricular offerings; (8) present and procurable staff personnel; and (9) material and facilities available and needed.

Surveys must be conducted by a competent individual having the ability to carry out such things as: (1) general organization and conduct of a survey; (2) work with advisory committees, education, industrial, and civic groups; (3) organize and direct field survey committees; (4) develop questionaires; (5) secure and analyze data; (6) report writing.

Survey specialists are persons who have either taught, had supervisory experience in vocational education, or both. Their backgrounds include training and experience in survey procedures to obtain school and industrial information and statistics and interpreting this data to the community and educational agencies. Pennsylvania and most other states have specialists on the vocational-education staff or some other branch in their departments of public instruction. Labor organizations, trade groups, and the state employment services are among other sources of this leadership.

An excellent Pennsylvania bulletin on trade and technical education surveys[2] recommends a steering committee and an advisory committee. The steering committee consists of not more than 10 representatives from school administrators. It is an over-all committee to give general direction in developing objectives, plans and procedures for the survey.

[1] *Report of Survey on the Need for a Vocational Program in the Trenton, New Jersey Area.* Trenton: New Jersey State Department of Education, Vocational Division, 1948.

[2] *Trade and Technical Education Surveys.* Department of Public Instruction. Commonwealth of Pennsylvania. Harrisburg, p. 6.

The advisory committee is larger. It promotes the work of the survey, assists in gathering and reviewing data, and provides consultants on special problems. The advisory committee consists of representatives from the following groups: (*a*) leaders in business and industry; (*b*) school administrators; (*c*) school-board members; (*d*) general public; (*e*) area coordinators of industrial education; (*f*) labor unions; (*g*) state employment service; (*h*) area redevelopment authority; (*i*) chambers of commerce.

Business and Industry Surveys

Surveys of business and industry are of particular importance to educational planning. Besides ascertaining the kinds and extent of occupational needs, this type of survey also brings school information to businessmen, secures their specialized judgments on educational problems, and ascertains the extent to which they will support new or expanded school programs.

The Pennsylvania bulletin[3] outlines for the survey specialist and steering committee some helpful procedures in securing data by the questionnaire methods.

An outline of the method follows:

A. Prepare a list of establishments in the area employing five or more persons.

   Names of establishments can be secured from:

   1. U. S. Employment Service Regional Office or State Employment Service.
   2. Chambers of commerce.
   3. Manufacturers' associations.
   4. State industrial directory.
   5. Classified telephone directory.

B. Send questionnaire material to industrialists and businessmen, making certain the material is written clearly and that it is brief. The material should include:

   1. Letter of instruction, which outlines the purpose of the survey, identifies the group sponsoring the survey, and asks the cooperation of the recipient.
   2. Information guide, which describes the setting, the need, and the aims, and brings together all of the general information about the proposed program.
   3. A questionnaire to be filled out and returned. Besides specific questions, space should be included for comments.

C. Prepare a report[4] on the basis of tabulated and interpreted data. The report should be concise, use graphic aids, and avoid subjective elements or forcing of data to support preconceptions. Representative favorable and unfavorable comments can be quoted in the ratio received.

Student Interest Survey

The chief single ingredient of all educational programs is, of course, the student. In planning, reliable estimates of student interests are of prime importance. Potential pupils need to understand thoroughly the nature of proposed offerings and assess carefully their own inclinations and capabilities in pursuing a future program to completion. Factors that tend to invalidate the future of present declarations are: haste and superficiality in considering future plans, immaturity in selfunderstanding, prestige and ambition pressures which exalt university and professional choices over technical and trade pursuits, and unexpected change in economic status. Guidance and parental understanding are important in making valid career choices, hence sound, long-range guidance is essential. Moreover, the general public, parents, and instructional staff must be informed and in sympathy with the proposed program.

Student inventories provide information on the number of students planning to terminate their education with high school, their interest in a trade or technical program, the kind of program desired, and the interests of adults in evening courses. A preliminary general survey can be used to assess the degree of student interest in the program. A second survey can be more specific with regard to skills or occupations desired, concentrating on those who are not planning professional careers.

The steering committee needs to keep the administration informed on all developments and prepare materials for the assistance of the counselors and teachers who will administer the survey in each school. The Pennsylvania bulletin[5] recommends an orientation meeting among the participating administrators, counselors, and teachers. It is suggested further that a survey committee from each secondary school of the area plan and carry out its own student inventory.

All students in at least two grades are surveyed. These usually are the 9th and 11th grades, although the 9th, 10th, or all the grades between 9 and 12, can be covered. The counselor, or some other person who is in charge, gives materials and instructions to the homeroom teachers. A covering letter goes to the students and their parents. General information about the program and descriptions of specific occupations are distributed along with occupational-interest survey blanks.

Students are asked the usual personal identifying information, besides particulars about their own future plans, including the kind of occupation if it is other than a profession. The parent fills in a part of the questionnaire, answering such questions as occupations of employed members of the family, and interests in evening classes by adults in the household.

The data secured from the surveys is tabulated by the survey specialist and his committee.

Implementing the Surveys

As already indicated, the surveys are valuable in securing objective data to replace guesswork and opinion. Citizens of open mind and good will can be won over to support educational causes by use of the orderly process of survey planning and the verifiable data that it will yield. The art of involving people has in itself psychological and educational value. The persons concerned come to know and to understand one another better. Often findings peripheral to the study itself may result in the discovery and confrontation of other educational needs.

The hard work of the survey is no guarantee, however, of acceptance and action. In fact, the evidence may indicate the wisdom of suspending or rejecting action, at least for the time being. Other surveys may be conducted later.

The profession by this time has accumulated a good deal of worthwhile "know-how" concerning survey techniques. They help considerably in educational planning. It is important, therefore, that survey and inventory procedures be among the sharpest tools in every educator's professional kit.

[3]Ibid., pp. 13-15.

[4]Robert Jacoby, *Business and Industry Survey Report on Trade and Technical Education Needs — Lebanon County — November, 1960.* Department of Public Instruction. Commonwealth of Pennsylvania, Harrisburg.

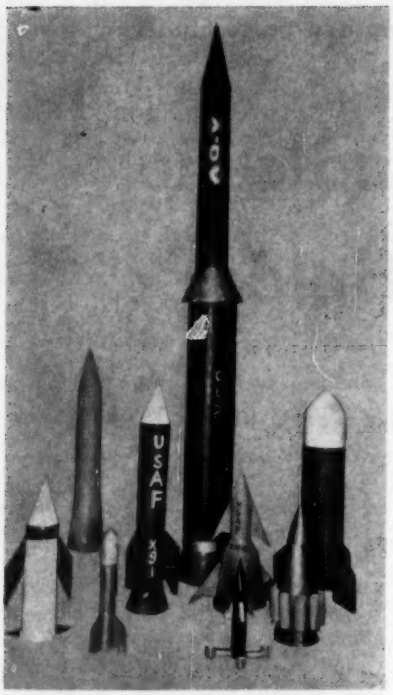
[5]Op. cit., p. 16.

Bibliography

Area Vocational Education Programs. Washington, D.C.: American Vocational Association, 1959.

Area Technical Schools in Pennsylvania.

(*Continued on page* 28)



Some of the work turned out by students who were taught developments using the teaching method described in this article.

Students understand their need when you use this method for

Teaching Developments

By Stanford D. Ruggles

Barrett Junior-High School, Columbus, Ohio

DESIGNING and building model space vehicles has proved to be an interesting way of introducing a unit in developments. Too often, units in developments follow a traditional pattern. These units begin with patterns for cubes and abstract prisms, progress through cylinders and cones, and finally reach their crowning glory in the pattern for a funnel.

Learning the method of developing these various shapes is, of course, fundamental, but frequently the teacher's presentation of these methods leaves the student bewildered and only half-interested. The problem is simply that the pupil sees no immediate use for patterns for rectangular pyramids or truncated cones.

This situation can be overcome by incorporating the same abstract shapes in an object with which the student is familiar. For instance, designing a space vehicle and making the developments for the various shapes becomes a fascinating experience for the pupils. They are familiar and quite interested in rocket ships and space vehicles. Current publicity and international concern with space travel and rockets is capitalized on when the student is introduced to developments in this manner.

The following is an account of a program that proved successful in a ninth-grade class. First, the pupils were given an opportunity to discuss space vehicles and various factors which influence design. From 10 different designs that each student submitted, he chose one and made a formal drawing showing front and top views. An analysis was then made of each drawing to determine what basic shapes were incorporated in the space vehicle. Most of the projects were composed of cylinders, right prisms, cones, and frustums of cones. After the student determined what basic shapes comprised his space vehicle, he then made a development of each shape allowing for tabs with which to glue the various parts together. The patterns were cut out, glued together, and painted.

It should be noted that at this point in the project the pupil saw the necessity for learning how to make the development and how to draw it accurately. If the pattern was not drawn accurately, it simply did not fit. He not only realized the use of patterns and developments for industry, but he also saw an immediate use for the actual development he was constructing.

Each space vehicle was constructed in class, using ordinary drawing paper, glue, tape, soda straws, and limited amounts of balsa wood. The student was encouraged to make developments for every part of his space vehicle such as nose cones, fins, etc.; but if warped surfaces and extremely small parts were needed, he made them from balsa wood.

The complexity of the design determined the complexity of the developments needed, and this, too, was geared to the ability of the student. Consequently, the slower student was able to succeed, and at the same time, the better student was challenged.

The completed space vehicles and rockets were displayed before the entire school, thus creating added interest for both the students who built them and for the other students in the school.

The preceding program was expressly designed to stimulate the interest of a ninth-grade class. Properly expanded, however, it could be successfully carried out on a high-school level. ★

"So it's unusual, now get back to work."

Ideal for elementary patternmaking

Candlestick Holder

Completed candlestick holders that are ideal for this time of year.

By Edward C. Klee

Brooklyn, New York, Technical High School

A VERY good looking and useful project to make in a general or industrial-arts shop is a pair of candlestick holders. This project incorporates drawing, patternmaking, foundry practice, and finishing techniques.

I have used a holly leaf as my design but you can use any kind of leaf or shape the student desires.

To start the project, the student makes a full-sized drawing of the leaf on a sheet of paper. This is transferred to a piece of wood by slipping a piece of carbon paper between the drawing and the wood. While holding them firmly in place, trace the outline of the leaf, and mark the center of the hole. The carbon paper will transfer the design to the face of the wood.

Place the block of wood in a vise, and draw two circles with a pair of dividers: one with a ¾" diameter for the bottom of the hole and the other ⅞" diameter for the top, to allow for draft. With a Forstner bit, drill the ¾" hole ⅝" deep. The next step is to taper the hole with a ⅜" radius inside beveled gouge from ⅞" at the top to ¾" at the bottom. Now, wrap a piece of garnet paper around a dowel and sand the tapered inside of the hole smooth. The hollow on the top of the pattern is to catch any dripping of wax that may occur. This is gouged down toward the hole with a flat, sweep, outside-bevel gouge and then sanded.

The drilling of the hole and the gouge work is done first so that you can hold the piece of stock in the vise while working on it. When this work is completed, you can saw out the outside shape using a band saw or a jig saw, with the table set at a 5° angle to allow for draft on the outside of the pattern. Now, set the spindle sander table to the same angle and sand the sides smooth.

To finish the pattern, sand the edges on the top of the pattern to a 1/16" radius and be sure it is smooth all over. Then apply one coat of shellac to the pattern and allow it to dry. Sand smooth with a very fine piece of used sandpaper. In the bottom of the hole, rub in a ⅛" radius wax fillet, and wax up any other imperfections in the pattern. Apply the second coat of shellac and allow this to dry. The pattern is now ready for molding.

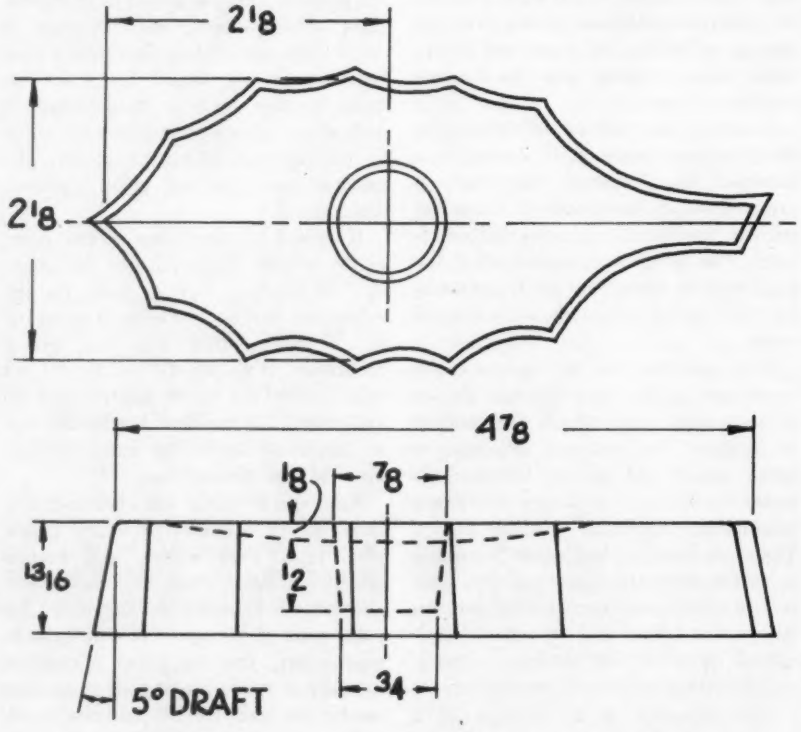
Mold the pattern in a small flask, pouring with either aluminum or brass. Cut off the gate and riser with a hack saw, and file the casting smooth where necessary.

Paint the casting dark green or leave it "natural." Shellac the bottom of the casting with two coats of shellac. While the second coat is still very tacky, apply a piece of green felt to the bottom. Allow it to dry and trim off with gouge or a knife.

Once the pattern is made, you can make as many castings as you desire.

Bill of Materials

No. of Items	Material	Size
1	Wood (mahogany or pine)	13/16" x 3" x 6"
	Aluminum	1 lb. per casting
1	Green felt	3" x 6"
	Shellac	
	Garnet paper	#60 and #100
	Green Paint	★

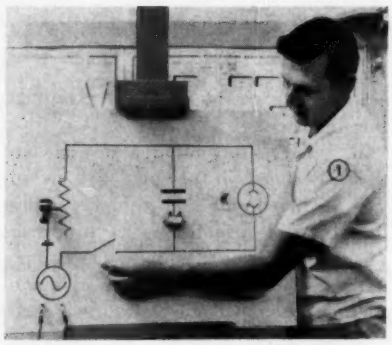


CANDLE STICK HOLDER

A Panel to Teach R-C Constant

By Isaac P. Hampton

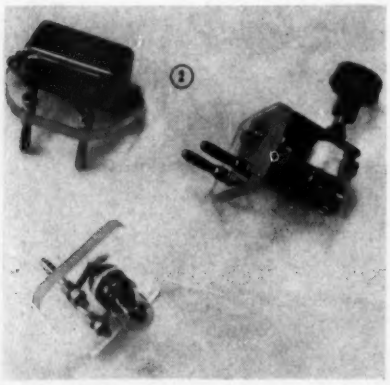
Chairman, Industrial-Arts Department, University of Florida, Gainesville



THE teaching aid described here has proven a valuable help in illustrating the effect of both resistance and capacity on the charge and discharge rate of a capacitor.

India ink was used to draw the schematic diagram on a plywood panel ¼" x 24" x 32". Latex wall paint provided an excellent surface for inking in the diagram. A pastel shade of paint was used to add interest. Afterwards the panel (Fig. 1) was sprayed with a flat lacquer to provide a more durable finish and to resist soiling.

Banana jacks, on 1" centers, were installed adjacent to the schematic symbol to which they applied. The required components were mounted on bases of ¼" plexiglass. Electrical contact was effected through banana plugs fixed to the plastic base. All wiring was done on the back of the panel.



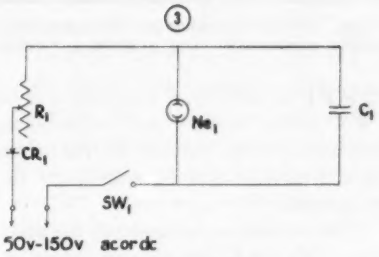
In operation, a d-c potential of 50v to 150v is applied to the input terminals of the panel. The current flows through R_1, the potentiometer, and charges the capacitor C_1. When the charge exceeds the breakdown voltage of Ne_1 (a neon bulb), the lamp will fire and allow the capacitor to discharge across it. However, when the discharge voltage drops below the firing point of the neon bulb the lamp will cease to conduct and go out. This cycle will be repeated as long as the circuit is energized, and the effect is that of a continuously blinking light—the blink rate being determined by the r-c time constant.

The time required to fully charge the capacitor at a given voltage will depend on the setting of R_1 and the value of C_1. By altering the value of either C_1 the r-c time constant will be changed, and the blink rate of the lamp will change proportionally.

A variety of capacitors, from .01 mfd to 4 mfd will provide adequate range for this panel. If the capacitors are mounted as illustrated (Fig. 2), it is a simple matter to substitute one for another, and observe the effect this has on the circuit. The potentiometer easily permits any desired resistance setting. If desired, several fixed resistors can be used instead of the variable resistance.

Fig. 1 shows a student operating the panel. A separate d-c power supply was used for this particular demonstration. As indicated by the schematic diagram, the d-c potential may be obtained directly from the a-c power lines by simply inserting a diode rectifier of 500-ma rating or higher in one side of the circuit.

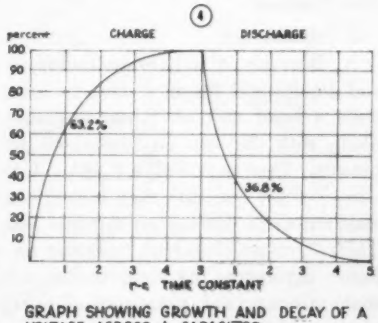
Fig. 2 gives a close-up view of the



R_1 – 1 – 1.5 MEGOHM POTENTIOMETER
C_1 – CAPACITOR ANY VALUE FROM .01mfd TO 4 mfd
CR_1 – DIODE RECTIFIER 150v 500ma
Ne_1 – NE 2 NEON LAMP
SW_1 – SPST TOGGLE SWITCH

method of mounting components on bases of plexiglass with banana-plug contacts. A schematic and parts list for this demonstration panel are given in Fig. 3. Fig. 4 shows a r-c time constant graph. It is seen that the time constant for any resistor-capacitor combination is that time needed to charge a capacitor to 63.2 percent of full capacity or to discharge it to a point 36.8 percent of complete discharge. As indicated by the graph, the charge and discharge rates are not linear. It takes five time-constants to bring a capacitor to either full charge or to complete discharge.

The writer has found that this demonstration panel, with the technique of using plug-in components, adds much to the convenience of illustrating an important principle in basic electricity. ★



GRAPH SHOWING GROWTH AND DECAY OF A VOLTAGE ACROSS A CAPACITOR

"Boy" inventors working at their inventions: a hair-tonic-dispensing plastic comb (left) and a drafting machine (at right in photo).

For the young Edisons, Bells, and Watts

Inventions and Patents

By Robert Irving

Meadowbrook Junior-High School
Newton Centre, Massachusetts

WE in industrial arts endeavor to study industry and its products, but how often do we consider the origin of the product and its subsequent development?

The foundation for most of the products of industry begins with invention. Invention can be defined as the intellectual creation of a new product, process, mechanism or design that never existed before or it can be a combination of "old" inventions.

Why, then, should the most important phase of our industrial complex be ignored in industrial arts? Most young people are fascinated by the accomplishments of Gutenberg, Edison, Westinghouse, Watt, the Wright brothers, and many other people famous for their inventions. Also, most young people are full of ideas but lack the guidance and direction to develop them.

With these things in mind, I introduced a unit in "Inventions and Patents" to my eighth-grade, industrial-arts classes. Interest was extremely high, and I found that, in general, this unit lends itself well to industrial arts. This unit could be conducted in any type of unit shop but is most appropriately carried out in the general shop.

The Outline

I. Introduction.

A. Because of individual limitations and interests, I found it best to introduce a brief unit on home appliances along with the one on inventions and patents. This provided for individuals who did not feel that they had the inventiveness to develop an original idea. Their "project" involved reporting on a home appliance; its construction, use, materials involved, principles of operation, care, and maintenance.

B. To arouse and sustain interest in the beginning, the class discussed "famous" inventors and their inventions and the impact they have made on present-day living. *Popular Science Monthly* has two features, "New Ideas from the Inventors" and "I'd Like to See Them Make," which are excellent bulletin board material and subsequent discussion material. It is interesting to note that many of the ideas that the readers have sent in to the "I'd Like to See Them Make" department in past years have been adopted and are presently on the market.

II. Content of material basic to an understanding of inventions and patents.

A. Constitutional provisions for patents and subsequent amendments: (1) what constitutes invention; (2) period of time that an inventor may sell his product prior to applying for patent; (3) period of protection provided under patent laws; (4) policy on patent renewals; (5) patent fees; (6) classification of patents.

B. What is invention and what are the criterions for patents: (1) definition of invention; (2) subjects within the scope of invention—(a) processes, (b) apparatus or machines, (c) composition of matter, (d) articles of manufacture, (e) designs, (f) improvements.

3. Invention must be—(a) new, (b) useful.

C. Procedure for securing a patent: (1) filing of application; (2) patent office procedure; (3) examination of application; (4) first official action; (5) applicant's response—(*a*) amendment, (6) acceptance or final rejection.

III. A brief description of marketing procedures can be presented.

IV. Student "inventions." As the unit develops, the students are asked to develop ideas of their own, either individually or with a partner. By this

(*Continued on page* 17)

A facsimile of the certificate awarded when a patent is approved.

Patent Certificate

Number _____

Issued by THE MEADOWBROOK PATENT OFFICE

Meadowbrook Junior High School — Newton Center, Massachusetts

Awarded to _____

For _____

Description of device: _____

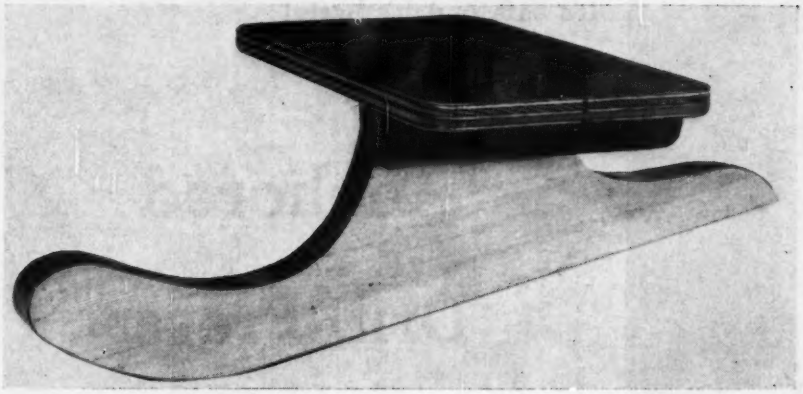
_____

By _____

Examiner

_____

Commissioner



A single-runner scooter that will provide hours of winter fun for your shop students.

Your students will all want a

Snow Scooter

By Uno A. Suomela
Charlevoix, Michigan, High School

DURING the winter season, youngsters of all ages can be seen balancing themselves on snow-covered scooters and sliding down snow-covered slopes. The design of these scooters vary from commercial grade to improvised models built in the school and home workshops. They all consist of a seat and a runner. This makes them fun to use and, therefore, interesting to students to make.

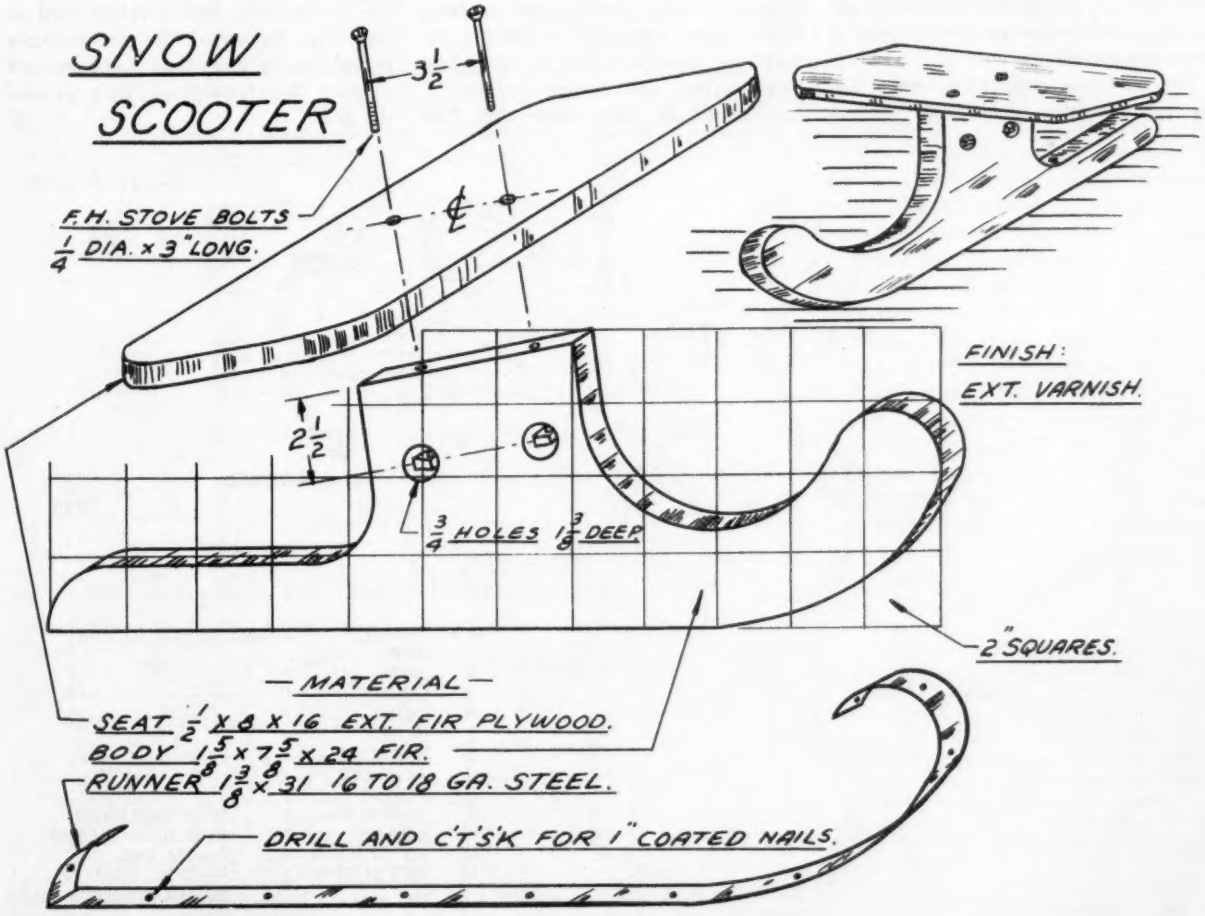
I selected this version because it lends itself to the use of materials easily obtainable in most communities.

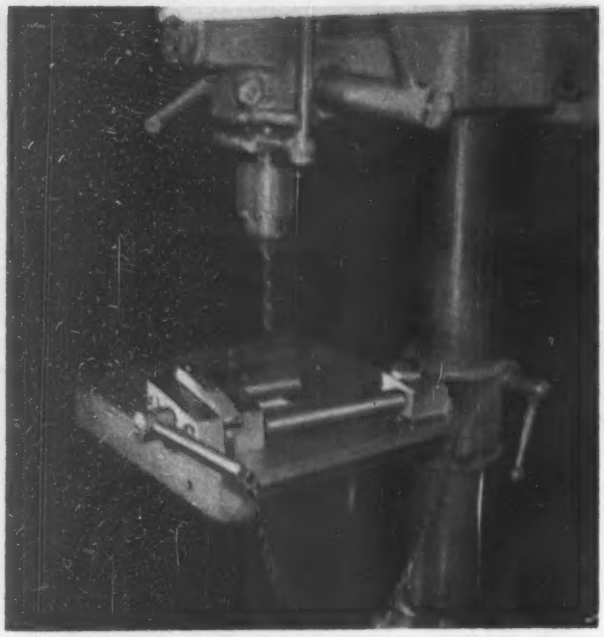
While school-shop projects are a means to an end in teaching fundamental skills, I know that most students prefer useful and practical things to build.

This project teaches the boy how to lay out and cut curves. It also affords the opportunity to use the spindle sander.

The best way to fasten the seat is with bolts, but screws or nails may be used. Sheetmetal fastened to the runner increases the efficiency of the scooter. The version pictured has two strips on the underside to use as handles although they are not shown in the drawing and are not essential.

For safety reasons, sand and round all exposed edges before finishing with exterior varnish or paint. ★


SNOW SCOOTER
3 1/2
F.H. STOVE BOLTS
1/4 DIA. x 3" LONG.
FINISH:
EXT. VARNISH.
2 1/2
3/4 HOLES 1 3/8 DEEP
2" SQUARES.
— MATERIAL —
SEAT 1/2 X 8 X 16 EXT. FIR PLYWOOD.
BODY 1 5/8 x 7 5/8 x 24 FIR.
RUNNER 1 3/8 x 31 16 TO 18 GA. STEEL.
DRILL AND C'T'S'K FOR 1" COATED NAILS.



The completed and anchored drill-press vise described here.

It's safe and it's useful

Anchored Drill-Press Vise

By Lewis J. Jenkins

Riverside-Brookfield, Illinois, High School

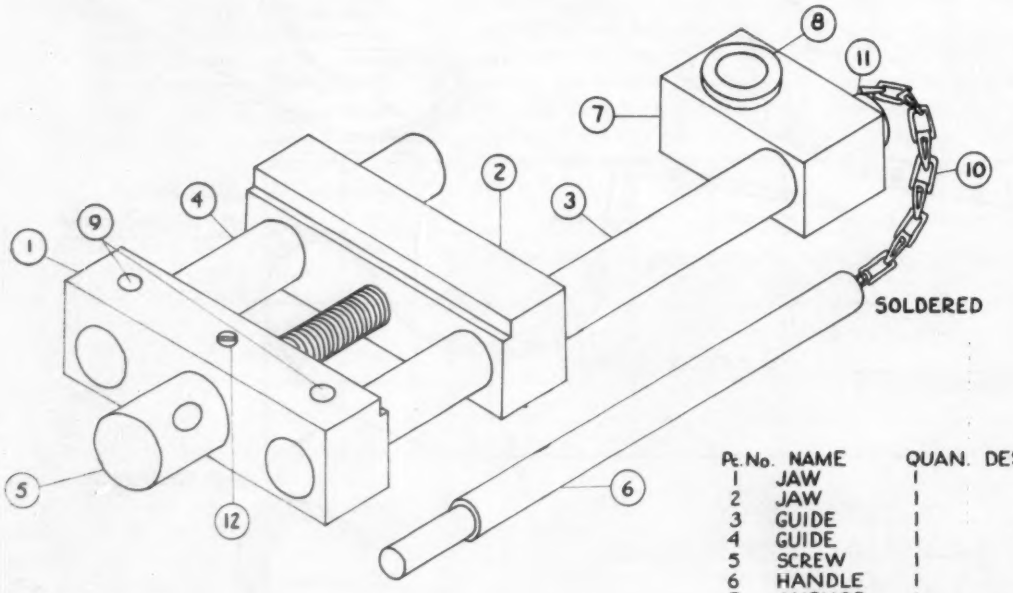
THE anchored drill-press vise shown here will make your shop a safer place to work. It will help to eliminate the hazard of cut fingers, broken drills, and damaged materials. Any one or all of these results when a drill "catches" a piece of material.

The machines required to make this vise are the lathe, drill press, vertical or horizontal mill, and the surface grinder.

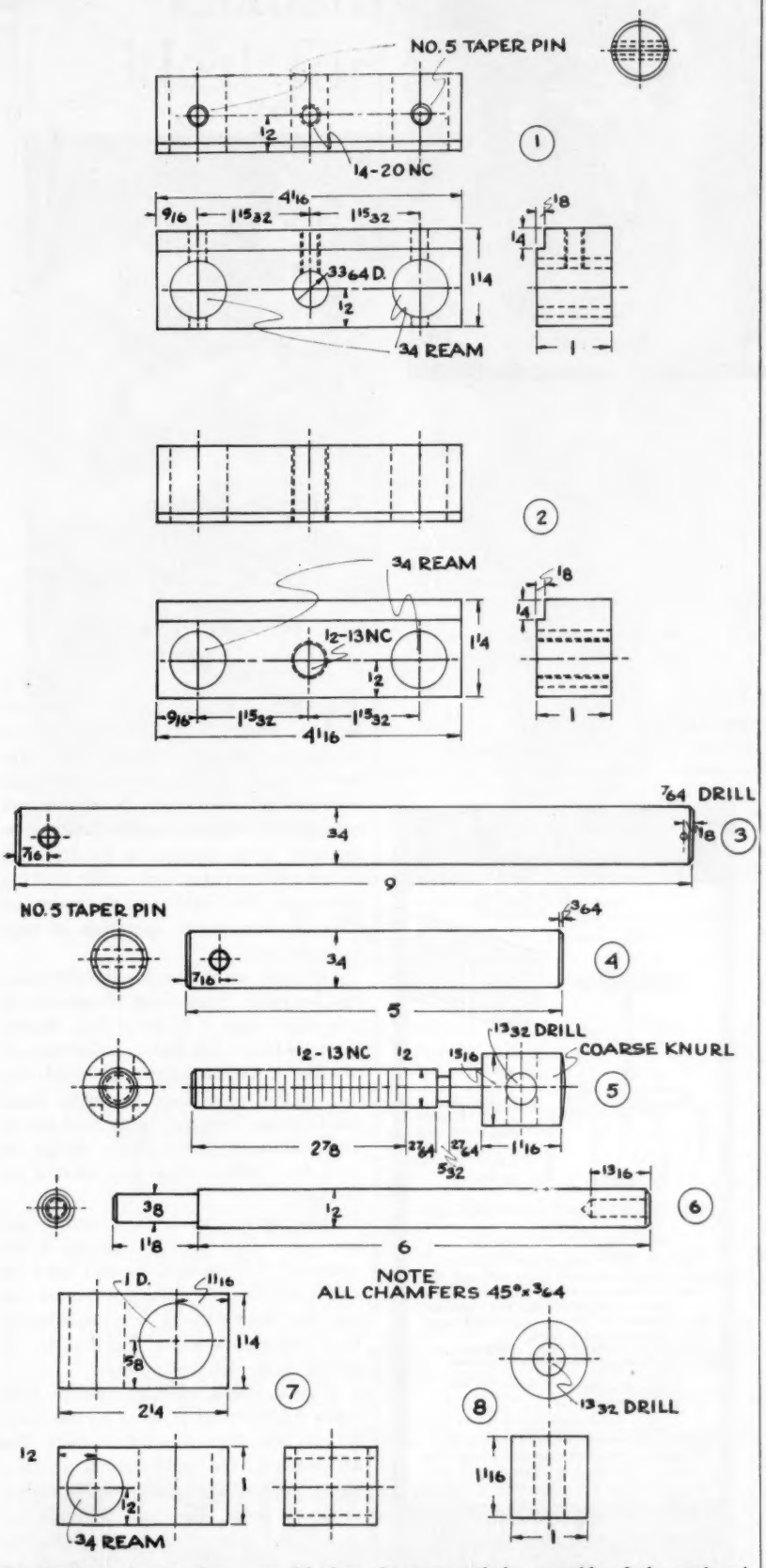
The operations that the boys learn when they make this vise are knurling; chasing threads; drilling and reaming holes; fitting tapered pins; setting up, adjusting speed and feed of mill; heat treating jaws; and surface grinding.

It should be noted here that Part No. 8 is bolted to a slot in the drill press table. Part No. 7 rotates on Part No. 8. Part No. 3 slides into Part No. 7.

Again, it must be said that this vise was designed to meet a safety need in our shop. Anchoring the vise prevents peeled fingers and other accidents and injuries that happen so often around the drill. ★



Pc. No.	NAME	QUAN.	DESCRIPTION
1	JAW	1	
2	JAW	1	
3	GUIDE	1	
4	GUIDE	1	
5	SCREW	1	
6	HANDLE	1	
7	ANCHOR	1	
8	PIVOT	1	
9	TAPER PIN	2	NO. 5 TAPER PIN
10	CHAIN	1	18 IN. SASH CHAIN
11	COTTER PIN	1	$\frac{3}{32}$ IN. DIA.
12	SET SCREW	1	14-20 NC. SLOTTED HEADLESS FULL DOG



The drawings above and on page 16 show the parts and the assembly of the anchored drill-press vise which was designed for increasing safety for work around the drill press.

Inventions . . . . *from page 14*

time they understand the criterions for invention and can make their preliminary sketches. It is suggested that, for practical purposes, the idea should be mechanical or electrical in nature. (Each participating student is given an outline to follow so that he knows what is required.)

After the preliminary sketches have been checked by the instructor, the student makes his final drawings and proceeds to develop a prototype or model, *if this is practical.* (If it can be readily done in the shop with existing equipment.) In many cases the drawing will suffice. When an individual has completed the requirements, he presents his "invention" to the "examining board" and the class.

V. Evaluation. The evaluation of the student's idea and presentation is done by a "patent office examining board" made up of a group of four or five class members, either elected or appointed. This board evaluates the invention in terms of its classification, usefulness, and whether it is a copy or infringement on a patented invention. The "inventor" is allowed to defend his idea through appeals to the board. If the board accepts the idea as an invention, the inventor is awarded a "Patent Office Certificate."

Conclusion

This unit should not be developed as an isolated topic but rather developed in conjunction with other units.

I have had excellent results to date, and find that the unit is both thought-provoking and invigorating to students and instructor alike. It is gratifying to know that junior-high-school students are capable of good independent thinking when given a little direction and a lot of opportunity. I have had such faith in some of the student inventions, that I have recommended that five of them seek further professional assistance. Perhaps, most important of all is the enthusiastic acceptance of this unit on patents and inventions on the part of the students.

Bibliography

The Story of the American Patent System, 1790-1940. Washington, D.C.: U.S. Department of Commerce, Patent Office.

Rules of Practice. Washington, D.C.: U.S. Department of Commerce, U.S. Patent Office.

Toulmin, Harry A., Jr. *Handbook of Patents.* New York: D. Van Nostrand Co., 1949.

Special Procedures in Patent Office. Washington, D.C.: U.S. Department of Commerce, Patent Office.

Popular Science Monthly.

Science and Mechanics, March-June, 1955. ★

"so much dust we could hardly see... and then we installed TORIT."

Arthur Stephenson, Manual Arts head, Wayzata High School, Wayzata, Minnesota says: *"Our shop was so dusty at times you could hardly see. Now it's clean. Our Torit Cyclone Dust Collector picks up everything including wood chips. It services a 20" planer, a 6" jointer, a belt sander, and a 10" circle saw. Collector and duct work cost less than $1,200."*

Dust is a menace in the school woodworking shop. Not only is it a health hazard, irritating to eyes, nose, throat, and lungs—it can be the cause of accidents in the shop. More and more schools are protecting students by solving shop dust problems with Torit Collectors. These machines have a proven efficiency rating of up to 98%. Being portable, they can be installed anywhere; and they cost very little. Available in both cyclone (shown) and cloth filter models in a range of sizes. For a FREE handbook describing Torit Dust Collectors and applications, write:

TORIT EDUCATIONAL DEPARTMENT
MANUFACTURING COMPANY
1133 Rankin St., St. Paul 16, Minn., Dept. 1442

FOR SAFETY'S SAKE

G.S. No. 657 GOGGLES
Type 657—Clear
Type 657-G—Green

FEATHERWEIGHT Protection for SHOP and LABORATORY. Fits all faces. Impact resistant lenses afford safety protection for light grinding, spot welding, etc. Worn comfortably over prescription glasses.

1 to 11 doz. — $6.00 per doz.
12 to 35 doz. — $5.40 per doz.
36 doz. & over — $4.80 per doz.
(Minimum order 1 doz.)

LIGHTWEIGHT SAFETY GOGGLES

Made of tough TENITE BUTYRATE PLASTIC. Protection wherever flying particles are a hazard. Impact resistant. Optical clarity for undistorted vision. Ventilation prevents fogging. Covers eye area completely, fits over glasses.

G.S. 1090-C (Clear) $15 per doz.
G.S. 1090-G (Green) $15 per doz.
(Minimum order 1 doz.)

Other Styles Available. Send For Free Catalog.
Open Accounts Invited.

GENERAL SCIENTIFIC EQUIPMENT CO.
LIMEKILN PIKE and WILLIAMS ST.
Philadelphia 50, Pa. HAncock 4-1550

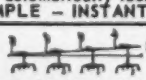
Famous Harco "LIFT-LOK" Chairs and Stools

Write, Wire or Call for FREE 30 day trial and details

Over 25 styles and sizes of chairs and stools available. Equipped with the famous "Lift-Lok" mechanism.

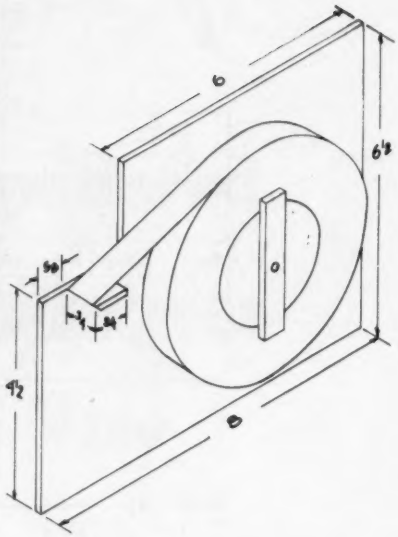
$1824

MATCHING CHAIRS AND STOOLS FOR ALL HARCO EQUIPMENT
The all NEW exclusive "Lift-Lok" adjustment automatically adjusts the seat for persons of all heights. From its lowest position to the desired height simply lift up seat and seat will automatically lock.
SIMPLE – INSTANT – POSITIVE



Write for Free Catalog and Price List
FULL 12 YEAR GUARANTEE ON ALL HARCO CHAIRS AND STOOLS

GARRETT TUBULAR PRODUCTS, INC.
P.O. BOX 237 DEPT. 55 GARRETT, INDIANA



A simple, rugged

Tape Dispenser

By Arthur F. Schuster
Gaskill Junior-High School,
Niagara Falls, New York

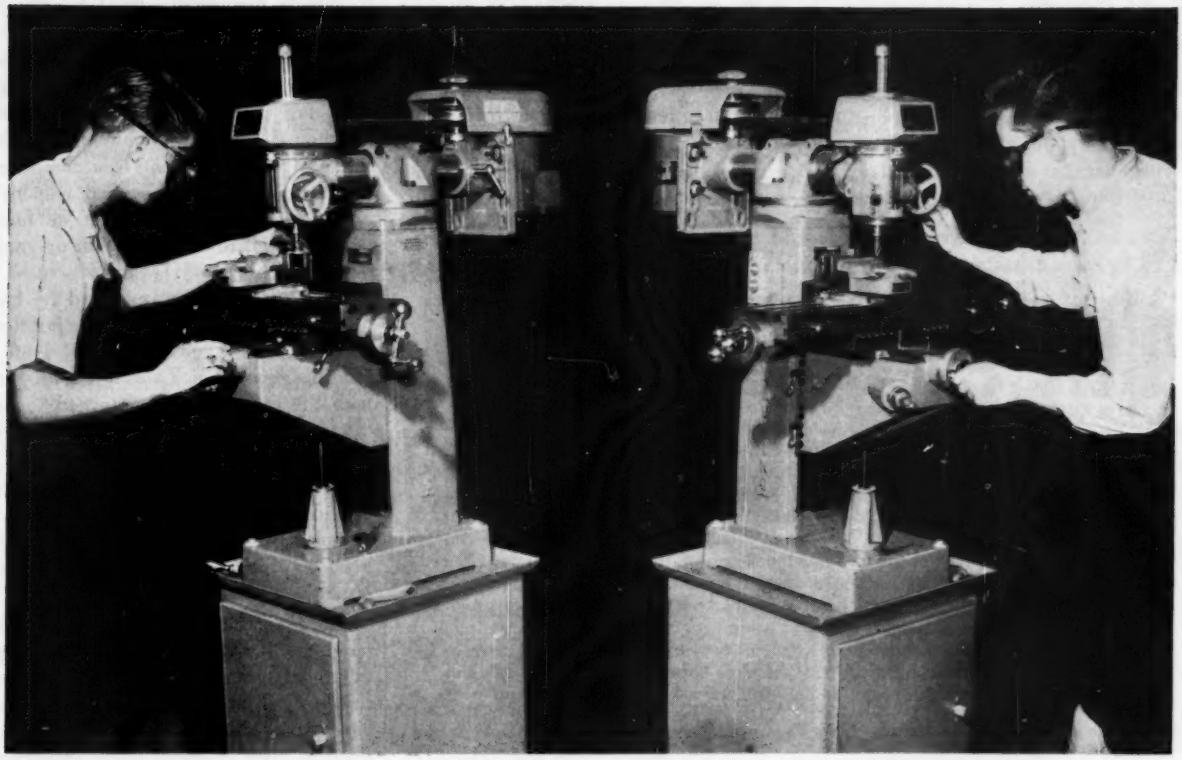
HERE is a masking-tape dispenser of simple design and construction, yet rugged enough to endure in a student climate. It requires only materials that are usually found in the shop's salvage box. When completed, it can be mounted in a convenient location, on the side of the paper rack in the drafting classroom, for example, to make an efficient, economical operation of tape distribution.

The base, or mount, for the dispenser can be made from sheet aluminum or galvanized iron. A 3" wood disc, mounted so as to revolve freely, holds the roll of tape. A narrow metal strip holds the roll on the wood disc. A cutting blade can be made from any fairly hard metal. The underside of the blade should be filed to a chisel edge and should be serrated.

This device tends to control the amount of tape used by making it unnecessary for students to tear tape by hand and eliminates the practice of cutting tape with scissors or a razor blade. In a central, convenient location, it will save time in distributing tape.

A good public-relations gesture is to make a number of these as a class project and offer them to other teachers. The art teacher, the publications advisor, and others who have tape-dispensing problems, too. They will be reminded of you and your program every time the call goes up in their room, "Where's the masking tape?" ★

"Clausing vertical millers are ideal for school shop training"



HERE'S PROOF OF PERFORMANCE

"Clausing Vertical Millers are highly versatile, accurate and rugged. They are ideal for school shop training because they provide valuable experience on so many different machining operations. It is the easiest to set up and operate of any miller in its field."

C. J. HARPER, HILLSIDE HIGH SCHOOL, HILLSIDE, NEW JERSEY

With a Clausing Vertical Miller, your students can have their work set-up ready for operation almost as quickly as if the machine were a drill press.

And they can gain valuable experience on many different operations, including: Shaping; Surfacing; Drilling, Boring, Reaming; Dovetailing; Angular Milling; Slotting.

Best of all, they can do *all* these operations with one work set-up! The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane, making it possible to mill, drill, bore, ream and shape at all angles without a single change in work setting.

The Clausing — a machine tool widely used throughout industry — is built to rigid standards for efficient operation, sustained accuracy and long service. For example, there are 7 ball bearings in the head and drive — feed screws have ground threads, turn on ball bearings — bearing surfaces of table, saddle and knee have gibs for lasting accuracy. It has the endurance you want and need.

Investigate this versatile, multipurpose machine tool before investing in *any* mill — it's the *one* mill that can be the busiest machine in your shop. And it's low in cost, only $875 f.o.b. factory.

Write for illustrated catalog today!

CLAUSING

CLAUSING DIVISION
ATLAS PRESS COMPANY
12-116 N. PITCHER ST., KALAMAZOO, MICH.

Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Work! Can You Beat It?

THE shop teacher in Podunk High School had earned his AB degree before he entered teaching, which meant that summer sessions he attended were directed toward study on a graduate level. As is customary in such cases, part of his efforts were expended in the field of research. In response to this part of his program, he had devoted some time to an inquiry into the conditions that prevailed during the lives of his ancestors.

During his investigation, he discovered that one of these ancestors, whose name was Joe, had lived with his family in a cave. Close to this cave there grew a huge oak tree. Its branches spread far and wide and provided shade from the rays of the sun. Joe loved to rest under the tree and meditate on "Man's inhumanity to man."

While he rested, Sam was at peace with the world. As time passed, however, he became conscious of the pangs of hunger in his stomach. He was content to continue his resting, but the longer he sprawled beneath the mighty oak the more acute became his desire for food. When the time came that this desire could no longer be ignored, he was compelled to consider what he should do about it.

It occured to him that he might delegate to his wife the task of obtaining food, but she was busily engaged with her household duties and tending the wants of their children. This compelled him to concede that she had responsibilities of her own and that he must bestir himself to find some fish or game or he and his family would starve.

Joe was a good citizen, and he had no desire to evade his responsibilities. So he took his club and departed on a hunting expedition. Luck was with him with the result that he returned to his cave with enough meat to satisfy his family.

This hunting expedition could not be considered sport; it was work. As a matter of fact, Joe considered it to be his job which he had to work at consistently to support his family.

The moral attached to this is: Every member of society must do something, or produce something, needed or wanted in our civilization. Every right-thinking citizen will consider it his duty to produce at least as much as he consumes. Really, he should produce even more goods or services than he consumes so that he may do his share to help those who cannot help themselves.

Like the hunter of modern times, Joe enjoyed his work. It satisfied his desire to kill game or catch fish. It pleased him that he was doing his share of the world's work. His work provided opportunities to enjoy the beauties of nature as he passed through the fields and forests, and it made him happy to think that he was successful in finding food for his family.

Work is necessary to the welfare of the world, and every citizen who recognizes the responsibilities of a citizen should be eager to do his part. Is it possible, or desirable, to impress this idea on the pupils in an industrial-arts class? ★

rugged! Logan / 14" LATHES

To withstand the terrific strain of metal-machining, a lathe must be rugged—*real* rugged. Logan lathes are. Solidly built headstock features large oversize spindle and ball bearings. Rugged carriage has double-walled apron, large tool post, and heavy-duty compound rest assembly. Extra-heavy duty tailstock provides rigid support for work. Wide, machine-cut change gears are made of "Ductile Iron." They have as much as triple the strength of some cast iron gears, and tensile strength superior to most steel change gears. The 10" x 56" lathe bed is another example of Logan ruggedness. Oversize ribs and balanced sections of even thickness effectively neutralize internal stresses. Lathe's capacity (14⅝" swing over bed, 9" swing over saddle, and 28" center distance) combined with ball bearing variable speed drive of 40-1400 rpm (no stopping to shift belts), makes Logan the best dollar value in the lathe field. Complete information on request.

MODEL 6510
$1,775.00
F.O.B. FACTORY

Logan
LOGAN ENGINEERING CO., DEPT. S-122
4901 W. Lawrence Ave., Chicago 30, Ill.

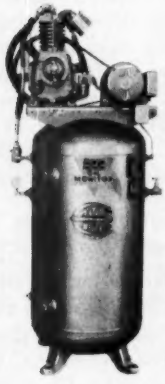
Industrial-Education Directors:
Please send in the names, school addresses, and the subjects they teach, for the new teachers in your schools to the Circulation Department, SCHOOL SHOP, 416 Longshore Drive, Ann Arbor, Michigan. Be sure to include specific subject(s) taught, so that the teachers will qualify to receive SCHOOL SHOP.

Air Compressors in School Shops

THE MODERN School Shop knows the opportunities provided by a compressed air system, and is making such a system available. Many school shops are being improved and altered to include a system, while others are still in the planning stages and will want to know more about such things as size of air compressor to install, the type of installation and the many factors to consider in a shop layout.

THINGS TO CONSIDER

Each school shop is an individual problem, but there are several general considerations in planning. A compressed air system has many applications, and the air compressor selected has to meet the demands of all the equipment it supplies. Thus, the analysis should begin with what will be the air supply needed. When the requirements are known, the type and size of air compressor will be relatively easy to determine. CHAMPION'S "How to Select An Air Compressor" booklet will be helpful in determining the ratings of various air tools and in analysis of the total air requirement needed. A copy is available free of charge, upon request.



Another important factor is one of installation. The air compressor has to be convenient to the shop layout, but it must have proper ventilation for cooling and the air around it should be relatively free of dust. The problem of sound is also important in many shop installations. Thus, location of the installation must be considered in relationship to the shop layout.

THE SAFETY PROBLEM

A compressed air system is relatively safe, but certain precautions have to be taken. All Champion Air Compressors have many built-in safety features: belt guards on both sides for the complete protection from the pulley and belt; safety valves; automatic tank drain; full 200 psi air tanks (built to ASME and National Board Codes); centrifugal unloaders to exhaust pressure from the pump at the end of each cycle (prevent overload on the electric motor during the starting phase); and the patented Oil Monitor which measures the oil level at the end of each cycle. Should the oil level drop below the normal operating level, the compressor will stop.

CHAMPION OIL MONITOR

CHAMPION AUTOMATIC TANK DRAIN

Proper care in maintenance will prevent many system failures, and avoid possible accidents. Like any fine quality shop equipment, an air compressor system needs careful attention for long, dependable operation at the highest level of safety.

AT YOUR SERVICE

Since 1919, Champion has been a designer and manufacturer of air compressors, and a planner of compressed air systems. If you have a problem, let us know about it. Send for our catalog and prices in addition to our planning booklet.

Champion's complete line of compressors permits you to choose the correct compressor to fit your needs. Champion manufactures both single and two-stage compressors covering a range from ¼ to 20 horsepower. A wide range of horizontal or vertical tank mountings, base mountings or portable units with electric motors or gasoline engines are available.

All Champion equipment is backed up by a national network of sales offices, parts depots and authorized service outlets for your convenience.

CHAMPION PNEUMATIC MACHINERY CO.

825 N. PLEASANT STREET • PRINCETON, ILLINOIS • Phone 3-1215

Complete Nation-Wide Organization of Champion Representatives at your service

Champion Products . . . conceived by common sense and perfected by experience

ence, to file with the secretary of state a

happenings in industrial education

Training Automechanics

FORD MOTOR COMPANY has announced an expansion of a training program in schools for automechanics which it inaugurated on a test basis last year.

Under the program, Ford-trained high-school instructors hold special evening courses for high-school students in their senior year. Where possible, the student is employed part-time by a Ford dealer. After completing the course, the student is offered full-time employment with a Ford dealer where he will be given more on-the-job training.

In the first year of the test program, 78 pupils and eight vocational-high-school instructors in various parts of the country participated. This fall, the enrolment is expected to be increased by 150.

Ford officials declare that, although the number of pupils participating at present is small, they feel the program will grow in importance. They anticipate that eventually it may enrol 3,000 or more each year as the effort becomes nationwide. The program is an attempt to alleviate the shortage of trained automechanics and to improve the worker's productivity.

New York Winners

ABRAHAM ASSA of Bronx Vocational High School was awarded first place in the 1961 "Best Job of the Year" machine-shop competition sponsored by the Machine Shop Teachers Association of New York City. His winning entry was a drill jig and vee block.

Second place went to Thomas Zoltmer of Ralph McKee Vocational and Technical High School, Staten Island, for a geared, multiple-thread mechanism. The third best job was a micrometer, lathe-carriage stop by James Meyer of Thomas A. Edison Vocational High School, Queens.

The winners received Kollsman Craftsmanship Awards.

Printing Teacher Directory

THE International Graphic Arts Education Association announces that, after two years of research, it has compiled a list of more than 2,600 graphic arts and printing teachers in the U.S.

The Association estimates there are more than 4,000 such teachers in secondary and vocational schools, technical institutes, teacher-education institutions, and colleges. Printing teachers who have not been contacted, are asked to write the Association, 1411 K St., N.W., Washington 5, D.C., to be sure their names will be included in the published directory.

Maine Group Meets

THE Maine Association for Industrial Education, meeting in Augusta on October 6, adopted a constitution and elected new officers as follows: president, William Warren, Fryburg Academy; vice-president, Carl Butler, Howland; secretary-treasurer, Wesley Wixson, Augusta; assistant secretary and editor, *The Newsette*, William Alexander, Gorham; and Maine Vocational Association representative, Harold Mailman, Camden. The principal address at the meeting was given by Lawrence W. Prakken, editor of SCHOOL SHOP, on "Modern Industrial Education."

Private School Law

To protect the public from fraudulent misrepresentations from profit-seeking operators of proprietary schools, a new Minnesota law, effective last September, requires trade schools operating in Minnesota, whether resident or correspond-

The remarkable J-LINE J-170 LATHE
with full 12" swing

• TOP CAPACITY
(39" between centers,
16½" swing over gap)
• HEAVY DUTY SPINDLE
• SAFETY ENGINEERED
• GAP OR SOLID BED

DESIGNED TO DO BOTH wood turning and metal spinning work — engineered to assure extreme accuracy, efficiency and safety at an unbelievably low cost.

THE VARIABLE SPEED drive allows operator to select any speed from 630 r.p.m. to 3450 r.p.m. without changing pulleys or belts, and with the machine in operation.

BECAUSE THE FOCAL point of any lathe is the headstock, special attention has been given, and no effort spared to make sure the J-170 Lathe would have the best. With such a headstock, operator is assured the machine will have a long life with a minimum of maintenance even under the most adverse conditions.

WHEN THE LATHE IS furnished with a magnetic starter, it will start at low speed only and has a push button for emergency stop at any speed.

Write for complete specifications and price.

Over 50 Years Serving the School Shops of America

BRODHEAD GARRETT CO.
4560 East 71st Street • Cleveland 5, Ohio

ence, to file with the secretary of state a continuing bond of $10,000 to assure performance of their contracts with students.

The schools are also required to file lists of their salesmen, and, if out-of-state, to name an agent in Minnesota who will be available to receive service of summons in case of legal action. In general, the schools are required to present evidence of having sufficient personnel, buildings, and equipment to teach adequately the subjects offered to students they enrol.

Exempted from the new law are degree-granting colleges and universities, accredited schools of nursing, all public schools, and reputable non-profit private and parochial schools. Approximately 112 schools operating in the state are affected by the new statute.

Last Call

STEPHEN JOHNSON, supervisor of industrial-arts education, Fort Lauderdale, Fla., who in the September issue of SCHOOL SHOP Magazine asked for the help of our readers in compiling a directory of industrial-education teachers who are radio hams and of schools who sponsor an amateur radio station, now has issued a "last call" before the directory is completed and printed.

Mr. Johnson reports that the directory will not be confined to just industrial-arts teachers and industrial-arts sponsored stations. Technical and vocational teachers and high schools also will be included.

Teachers who have not answered Mr. Johnson's previous request may do so by writing him, c/o Board of Public Instruction, 1320 Southwest Fourth Street, Fort Lauderdale, Fla.

New Dunwoody Chairman

RUSSELL H. BENNETT, who has been chairman of the board of trustees of The William Hood Dunwooody Industrial Institute since 1937 (with the exception of an interim period between 1948 and 1953) has been succeeded by Paul E. Wishart, president of Minneapolis-Honeywell Regulator Co. Mr. Bennett will continue as a board member.

Craftsmen Registry

THE Rockefeller Foundation has announced a grant of $101,000 to the American Craftsmen's Council, a national organization that offers education in the crafts and attempts to stimulate public interest in the work of American craftsmen. (*Turn to page* 24)

NEWS FROM WELLS MFG. CORP.

HORIZONTAL BAND SAW PIONEERS

A CONVERTIBLE BAND SAW

that will give you the capacity you've been looking for in a compact, modestly priced machine.

As a horizontal cut-off saw — As an upright saw

The new WELLS MODEL 58-B

Double Duty — Double Value Band Saw

• Here's the all new metal saw you have been asking for . . . Wells Model 58-B . . . designed and built to give you double duty—double value. It's a compact, rugged, well guarded, extremely versatile unit at an economical price.

As a horizontal cut-off saw, Model 58-B features quick action vise (swivels to 45 degrees), automatic shut-off and adjustable guides.

For vertical use, just swing head into upright position and install work table.

To give it complete mobility, a wheel-handle unit is available as optional equipment.

If you cut metal in the shop or on construction jobs, check the profit building advantages of Wells Model 58-B. Call your nearby Wellsaw Dealer or write for descriptive literature.

SPECIFICATIONS

Capacity:	
Rectangular ..... 6" x 10"	Floor Space ..... 19" x 47"
Round ..... 6" Diameter	Height (Frame Vertical) ..... 52"
45° Angle ..... 5" x 5"	Height (Frame Horizontal) ..... 37"
Speeds, f.p.m. ..... 76—141—268	**Vertical Capacity:**
Blade Size ..... ½" x .025 x 93½"	Work Table ..... 7⅞" x 10"
Motor ..... ½ H.P.	Throat Height ..... 9½"
Width of Bed ..... 8½"	Throat Depth ..... 7¾"
Floor to top of Bed ..... 22¼"	Net Weight (Approx.) ..... 220 lbs.

Wellsaw

The Pioneers of Horizontal

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION

2600 Shop Avenue — Three Rivers, Mich.

From around the Nation:

principal's office. From the beginning

The grant is to assist the Council in completing an information file on U.S. craftsmen and their work. At present the Council has accumulated information on all phases of work in the crafts in the U.S., including illustrations of the products of nearly 500 craftsmen living in all parts of the country. The grant will permit this file to be expanded to include, by 1964, information on 2,500 artist-craftsmen with both black-and-white and color photographs illustrating the style and quality of their work. The Council will keep the file up to date to give leading craftsmen a permanent forum for their work. ★

CONVENTION CALENDAR

American Vocational Association, Kansas City, Mo., Dec. 3-8.

Illinois Vocational Association, Hotel Pere Marquette, Peoria, Mar. 1-3.

California Industrial Education Association, San Diego, Mar. 9-10.

Michigan Industrial Education Society, Civic Auditorium, Grand Rapids, April 12-14.

American Industrial Arts Association, Pittsburgh Hilton Hotel, Pittsburgh, Pa., April 16-19.

PUSH BUTTON *Speed Selection*

from **to** **in seconds**

or to *any* intermediate speed, *instantly*

Teach modern methods with these strictly modern lathes that eliminate all hand belt shifting and deliver even the new high speeds with the touch of a button.

It's that easy!

The work is done by a motor driven speed changer. It accelerates or slows the lathe to any desired speed in seconds. With a 10:1 ratio, this new variable drive makes it easy to select from a wide range of speeds—200 to 2000 rpm in direct drive and 40 to 300 rpm in back gear.

Maximum stability and smooth power transmission are assured because the drive unit is oversized. All pulleys and shafts are fully supported (eight bearings). Double V-belts throughout the drive eliminate slippage and deliver full power to the spindle. Because of this rigidity and extra pulling power, this lathe will take heavy cuts at all speeds and precision finish cuts at high speeds.

It is a precision lathe moderate in price with the versatility for safely teaching both beginning and advanced students.

SHELDON *Variable Speed* **PRECISION LATHES**

Illustrated WM56P 13" Swing- 34" Centers

Write for

"Variable Speed" Circular and General Catalog showing . . .

•

10", 11", 13" and 15" SHELDON Precision Lathes (Bench, Pedestal and Cabinet types)

•

13" and 15" SEBASTIAN Geared Head Lathes

•

SHELDON Milling Machines

•

SHELDON Back Geared Shapers

SHELDON MACHINE CO., INC.

4260 N. Knox Ave. Chicago 41, Ill.

*strictly personal

Donald G. Lux has moved frrom his post as assistant dean, College of Education, University of Illinois, to serve as chairman of the industrial-education division at the university. **Rupert N. Evans**, the former chairman, is now associate dean of the College of Education.

D. D. Nothdurft, now associate professor of industrial education at the Northeast Missouri State Teachers College, was on the faculty of the Maplewood-Richmond Heights School District of St. Louis, Mo., County.

New members of the industrial-arts department faculty at Central Missouri State College are: **Victor Ingrum** and **Leonard Fluharty**, production printers; **Jack Horine** replaces the late **Robert E. Smith** in the college laboratory school as supervising teacher of the student teachers; and **Charles Keseman**, although at present on call for active duty in the Air Force, has been made a permanent member of the staff.

Thomas Gray, now a printing instructor at Stout State College, taught formerly at Central Missouri State College.

H. L. Helton, former chairman of the industrial-arts department at Northeastern State College, Tahlequah, Okla., has accepted a two-year appointment with the Oklahoma State University to serve in Rawalpindi, West Pakistan, with the University's Pakistan Technical Education Program. **W. F. Van Trump** has replaced Mr. Helton at Northeastern. He was vocational coordinator and director of adult education at Columbia, Mo., Public Schools.

George W. Schwartz and **Kent Clark** have been appointed assistant state supervisors of trade and industrial education for Virginia. Mr. Schwartz and Mr. Clark both were previously teachers, their most recent assignments being at the technical level.

George E. Wallace has been appointed Virginia state supervisor of trade and industrial education. He had been on the state department staff since 1951.

Hobart H. Sommers, assistant supervisor of schools, department of vocational and practical-arts education, Chicago, has been granted a special six weeks' leave of absence to serve with an International Cooperation Administration team to make a survey of the status and need for vocational education and training in eight African countries.

Carroll W. Smith has been appointed North Carolina state supervisor for industrial arts. He was on the staff of East Carolina College Greenville. **Blondy Scott**, formerly an industrial-arts teacher at Ashboro, N.C., High School, has been appointed to the staff at East Carolina College.

Robert Toft has been named director of the vocational-technical institute planned for Cape May, N.J., County. He has been a teacher, supervisor, and director of the evening-school division at the Middlesex County Vocational-Technical School.

Don E. Hepler has been appointed industrial education editor for the McGraw-Hill Book Co., Inc. He was on the industrial-arts department staff of California, Pa., State College. ★

From around the Nation:

Two Talented Boys

By Franklin J. Keller

(EDITOR'S NOTE: Franklin J. Keller, retired principal of Metropolitan Vocational High School, New York City, is director of the Vocationally Talented Pupils Research Project. He has visited vocational programs throughout the United States in the last few months so we asked him to write down for our readers some of the informal observations he has made as he has witnessed what the schools are doing. This is the first of a series of such short observations.

The Project was originated by the American Vocational Association, is sponsored by Rutgers University, and it is supported by a one-year grant from the Cooperative Research Branch of the U. S. Office of Education.)

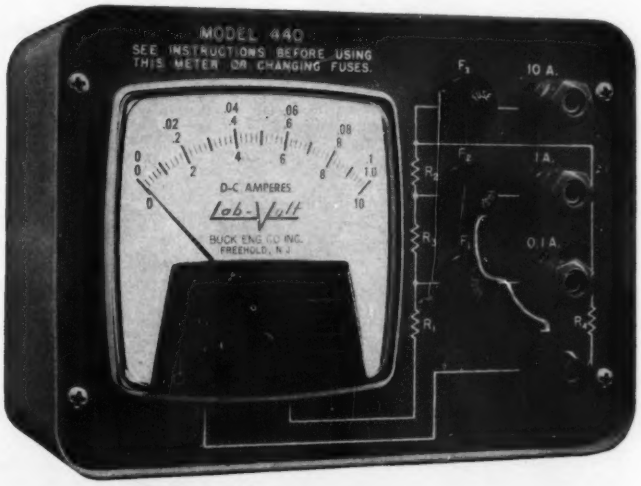
●

In Washington, D. C., Francis A. Gregory, Assistant Superintendent of Schools, and member of our AVA Vocationally Talented Pupils Committee, accompanied me on a visit to the Bell Vocational High School. Having spent five years at teaching English in De Witt Clinton High School in New York City, I find it difficult to pass by an English class without peeking in. From what I saw on the blackboard, here was just such a class, happily engaged in reading *Les Miserables.*

Seeking to justify my sudden intrusion, I asked whether some pupil would tell me how to pronounce that title. They were all bashful (or perhaps annoyed), so I got no response. I then suggested that it had been a common experience in my time to hear it as "less miserables," just as in English. I got a little titter and that was all. However, outside the building, as I was about to step into Mr. Gregory's car, a fine, tall, upstanding boy came up to me and said, in the most friendly fashion, "Sir, we pronounce that title 'Lay Miz-er-á-ble,'" giving the words the exact French pronunciation.

He was working in the welding shop and was, according to Mr. Gregory, destined to become an excellent tradesman. That's the kind of boy for whom we are looking. That's the kind of boy that American schools can produce.

At one point during my visit to the New Bedford (Mass.) Vocational High School, a senior boy was asked to conduct me from the girls' division to the principal's office. From the beginning our survey was planned to search the minds of pupils as well as those of teachers. So, at every opportunity I asked questions. Denis Sampson came up with a treasure. He was specializing on mechanical design and pre-engineering, but in the meantime was managing his father's riding school. He told me, with enthusiasm, all about the horses. His expression was excellent. His knowledge was precise. His judgment was sound. Regardless of whatever occupational future he desired and of whatever he was learning in school, he was



NOW Lab-Volt BRINGS YOU...

FUSED METERS SAFE FOR STUDENT USE!

Here's a Buck Engineering break-through that will end continuous drain on your science funds for repair or replacement of burned out electrical meters.

This revolutionary feature incorporated in a brand new line of meters (designed expressly for educational work) makes the Lab-Volt Companion Line a must for every science program.

COMPLETE PROTECTION from electrical damage by replaceable fuses. Students may use these units without supervision, as they can't be burned out, even when misused.

FUNCTIONAL Selection of ranges insures easy reading of all values throughout the entire range of every meter. Border-to-border scales are up to 28% larger than older models and are not obscured by pointer or shadows. Units may be used horizontally or vertically and stack compactly for storage. All connections are made through five-way binding posts. A schematic diagram on front panel adds educational value.

DURABLE Sealed mechanisms provide complete protection against moisture and dirt, insuring continuous accuracy of ±2%.

Jeweled moving parts insure long life with free movement. Construction is of heavy gage, cold rolled steel, finished in scuff-proof vinyl.

ECONOMICAL Complete metering service is provided by only five competitively priced, multi-range models (A.C. and D.C. voltmeters and ammeters, and D.C. galvanometer).

SEND OR PHONE TODAY FOR COMPLETE INFORMATION

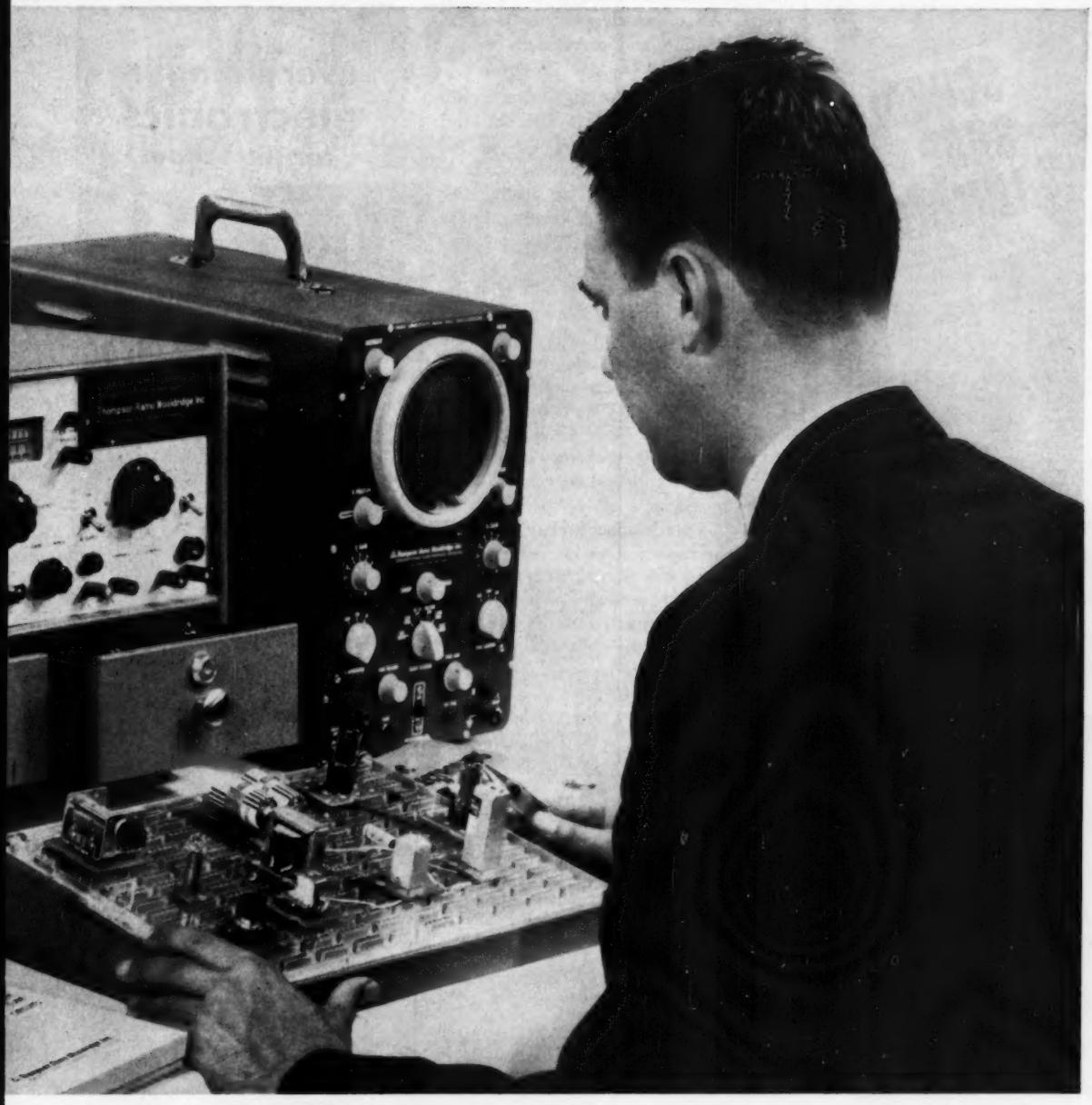
Lab-Volt SCIENCE EQUIPMENT
Division of
BUCK ENGINEERING COMPANY, INC.
35 Marcy St. • Freehold, N. J. • HOpkins 2-1111

TRW's New Electricity and Electronics

Students of basic electronics learn quickly by doing with DeVry Electronics Trainer System.

This laboratory system is tested and proven effective by the DeVry Institute's more than 30 years' experience in teaching electronics. It enables the student to visualize electronic theory and build the actual circuitry as the course progresses. The fact that the student receives immediate reward promotes incentive and eliminates unnecessary repetition. A fully integrated program, it is being offered for the first time to educators by Thompson Ramo Wooldridge Inc., Educational Electronics Division. Basic and advanced electronic courses are available.

TRW



Training Program can help you

Easy to use

Students build electronic circuits on the system by simply placing a schematic under the new patented transparent circuit board and matching the proper plug-in component to the symbol printed on the schematic. Terminal strips, 150 of them, well-insulated and encased in the plastic board, provide 750 positive contact points for assembling circuits and accept leads from all standard components. The variety of circuits possible is almost limitless. There are no connections to break, joints to solder, or clips to handle.

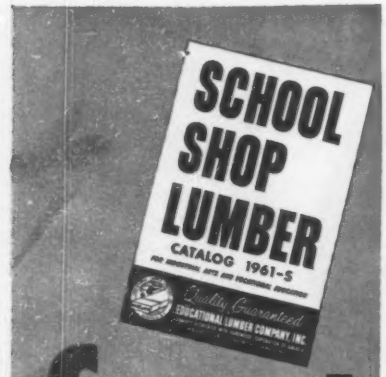
Complete Electronics Training Program

Components consist of the transparent circuit board, a power supply-signal generator, a storage cabinet, teacher's manuals and student workbooks and schematic templates. They can be readily coordinated with many standard textbook programs.

For additional information about this new TRW electronics laboratory program, write today to: Educational Electronics Div., Thompson Ramo Wooldridge Inc., 6325 Huntley Road, Columbus 24, Ohio.

Thompson Ramo Wooldridge Inc.

Educational Electronics Division
6325 Huntley Road, Columbus 24, Ohio



free!

LUMBER FACT MANUAL AND CATALOG

a valuable aid to your shop training

- Description and characteristics of 18 species of shopwork lumber for Industrial Arts and Vocational Education
- Informative reviews on scores of instructional and project books
- Helpful woodworking tips, definitions, and general information

Educational Lumber Company offers higher quality, wider selections, and lower prices—top-grade wood that's pre-sized and flaw-free, providing more usable board feet per order. Truck deliveries direct to school. Bulk quantity bids promptly submitted.

SEND FREE EDLCO BOOK NOW!

Name

Address (Street or RFD)

City

Zone State

EDUCATIONAL LUMBER COMPANY, INC.

FORMERLY ASSOCIATED WITH HARDWOOD CORPORATION OF AMERICA

P. O. Box 5171 Asheville, N.C.

getting practical experience of great worth. All of which suggests cooperative education and diversified occupational training.

To convey the "psychological quality" of these incidents is difficult. And yet, it is such as these that make for the understanding of education. It is essential that we have an acute sense of what the incidents mean. Again, as I wrote sometime ago. "Probably this sense of psychological quality is the most important factor of all. It is inherent in the unforgettable school scenes of great literature, of which there are all too few. Perhaps the best remembered are the spelling-window-washing lesson in 'Dotheboys Hall' and the composition contest in *A Window in Thrums*. 'First they spells "w-i-n-d-e-r" and then they goes and does it.' So sensitive was Dickens to the psychological quality of the incident and so powerfully did he convey it to his readers, that all England was stirred up to a reform of its social system, especially the school. So poignantly did Barrie make his readers feel the universality of Sentimental Tommy's artistic soul in his search for the right word that the book itself is a high work of art, a compelling piece of literature." ★

The Survey . . . . *from page 10*

Harrisburg, Pa.: Department of Public Instruction, Commonwealth of Pennsylvania, 1958.

Trade and Technical Education Surveys. Harrisburg, Pa.: Department of Public Instruction, Commonwealth of Pennsylvania, April, 1960.

Jacoby, Robert. *Area Technical School Plan for Western Lancaster County (Pa.).* October, 1958.

Jacoby, Robert. *Area Technical School Pupil Interest Survey Report: Grades 9, 10, 11 in Western Lancaster County (Pa.).* November, 1960.

Area Technical School Business and Industry Survey. Lancaster, Pa.: Lancaster County Manufacturers' Association and Lancaster Chamber of Commerce, May, 1959.

Area Technical School Pupil Interest Survey Report in Grades 9, 10, and 11 in Lebanon County, Pa. Lebanon County, Pa.: County School System, October, 1955.

Vocational Education for Montgomery County. Norristown, Pa.: Montgomery County Branch Bureau of Municipal Research and Pennsylvania Economy League (Eastern Division), December, 1955.

Novak, Benjamin J. "Pennsylvania's Buck County Technical School." (*Industrial Arts and Vocational Education*), March, 1958.

Trained Manpower for Industry through Vocational Education, Harrisburg, Pa.: Pennsylvania State Chamber of Commerce, Bulletin No. 156, 1959.

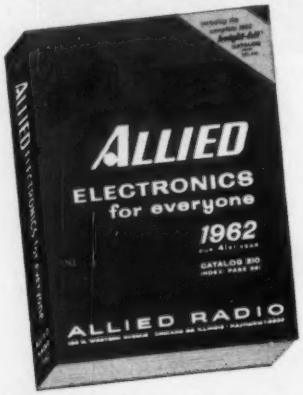
Occupational Outlook Handbook. Washington, D.C.: U.S. Department of Labor, Bulletin No. 1255, 1959. ★

everything in electronics for the school

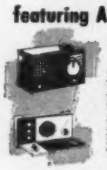
free *send for the money-saving* **1962**

ALLIED CATALOG

444 VALUE-PACKED PAGES



featuring ALLIED's own *knight-kits*® for Electronics Training



A complete selection of exceptional kits for training purposes, including the new 100-In-1 Electronic Science Lab kit, the famous "Ranger" radio kit, test instrument kits—over 70 KNIGHT-KITS available...

WORLD'S LARGEST STOCKS

- Language Lab Equipment
- Test Instruments, Meters
- Tape Recorders & Accessories
- Recording Tape, Hi-Fi Records
- Stereo Hi-Fi Equipment
- School Sound Systems
- Electron Tubes, Transistors
- Tools and Books
- Thousands of Electronic Parts for Every Need

EXPERT SCHOOL SUPPLY: One order to ALLIED fills the whole bill—speeds your buying, saves you money. We specialize in equipment for training in electronics—see our remarkable KNIGHT-KITS. For *everything* in Electronics, send today for your FREE 1962 ALLIED Catalog.

ALLIED RADIO

Specialists in Electronic Supply for Schools

FREE Catalog

ALLIED RADIO, Dept. 9-M1
100 N. Western Ave., Chicago 80, Ill.

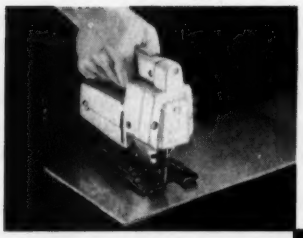
☐ Send FREE 1962 ALLIED Catalog

Name
PLEASE PRINT

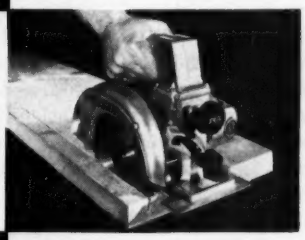
Address

City Zone State

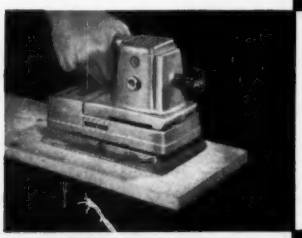
NEW IDEAS
IN PORTABLE POWER TOOLS
FROM SKIL



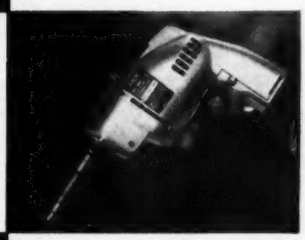
2-Speed Jig Saw—world's fastest. High speed cuts wood, plastic; low speed for cutting metals. Cuts plywood without splintering! (Model 160)



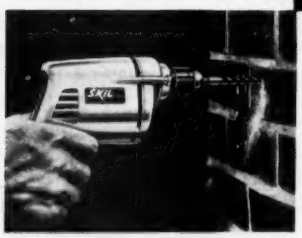
"Burnout-Protection" Motor in this new 6½" Skilsaw (and seven other Skilsaw circular saws) backed by full year free service policy.



2-Way Sander—does both jobs: fast orbital sanding, finest straight line finish sanding. Big 4½" x 9" sanding pad. (Model 692)



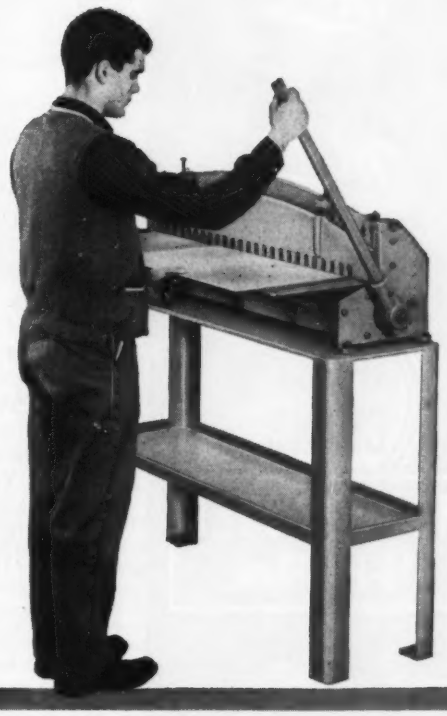
Lowest Cost Screwdrivers—for fast professional assembly work. Skil Model 139 sells for only $45.00, reversing Model 140—$53.00.



Low Cost Ball Bearing Drill—only $34.50. Powerful 2.5 amp motor. Industrial rated, ¼" capacity. Built for years of hard use. (Model 70)

Ask your Skil distributor for demonstrations. Look under "Tools-Electric" in the Yellow Pages. Or write: Skil Corporation, Dept. 141L, 5033 Elston Avenue, Chicago 30, Illinois

SKIL POWER TOOLS



Greater mechanical advantage of the

NEW DI-ACRO 36" SHEAR

brings safer, easier, more accurate shearing to the school shop

Easy . . . Fast . . . Safe Unique cam-lever drive of this new Spartan Model No. 36 Di-Acro Shear develops up to 6 times the shearing pressure of lever action shears. A 16 pound pull provides the same shearing force of a 100 pound "kick". This results in better control over material and machine for fast, easy handling with less chance for accident. Rugged steel construction provides distortion-free operation over full 36" width. Roller bearings bring the angled blade down and through material with a minimum of effort. An automatic hold down grips sheets for die-accuracy in shearing metals, plastics, meshes and all other shearable materials. Will notch and slit as well as shear. Write for new, fully illustrated folder.

DI-ACRO NOTCHER Rated at a 4-ton capacity, this Di-Acro machine will cut a 6" x 6" notch in 16 gauge sheet steel in one operation. Adjustable gauges locate notch. Write for details.

YOU REFLECT THE MATERIALS AND PROCESSES OF INDUSTRY WITH di-acro PRECISION METALWORKING MACHINES

DI-ACRO CORPORATION (Formerly O'Neil-Irwin Mfg. Co.)
9012 8th Ave., Lake City, Minn.

Please send literature on new Spartan No. 36 Di-Acro Shear and Di-Acro Notcher.

Name_____

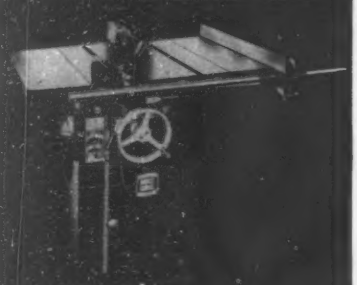
Name of School_____

Address_____

_____

Your Position_____

More
More
BOICE CRANE
MONOMASTER
10-Inch Saw



Motors to 3 h.p. Outperforms many 12" saws. Single blade control convenience. 44% more ripping capacity. Rigid cast-iron fence opens 37" on standard, 49" on super model, enough to halve 6' and 8' panels respectively; both faces precision ground. Blade turns up to 29% faster. New type, oversize, Anglemaster trunnion. *Steel* table insert serves saws *and* dado heads. Blade tilts left—safer for right handed operators. Basic unit, *only $275!*

Send for free literature.

Illustrated "Do-It-Yourself" Book details popular projects, tells how to plan, estimate costs, purchase materials, and get job done. Charts on nails, moulding designs, lumber cuts. 25c stamps or coin.

"you don't have to agree with me, but..."

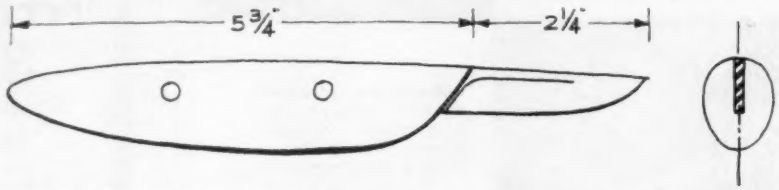
Speaking of Design

By Aarre K. Lahti
Professor of Design, University of Michigan, Ann Arbor

Q. Thus far we have discussed the designing of things generally not considered to be utilitarian. What would you have to say if we were to consider the designing of a tool?

A. "Off hand, it could seem that tools would have little need for those aspects of design concerned with appearance, feel, etc. Yet, some of the very best designing has evolved in hand tools. For our specific example let us consider designing a shop work knife. It may come as a surprise, but there is no such tool available on the market.

"Our first hurdle will be to rid ourselves of knife stereotypes. Among these are the 'he man' hunting and butchering knives, the homey potato peeling knife, kitchen knives, and romantic 'Black Forest' daggers."



Q. Well, what design factors would you consider?

A. "I would have to begin by considering what this knife must do. But before I start, let us digress for just a moment and discuss the basic issue that has already been postponed for too long. I am a believer of this: Only functional design can be good design. However, we must not fall into the trap of thinking that function exists beyond man and his culture.

"The design for a knife, as well as everything else, must fulfill three basic functions: One of these, the *mechanical function,* demands that the blade have a proper wedge for cutting, a shape for straight whittling, a curve for hollowing, and a point for digging and scribing. Also, it must cut wood, cardboard, paper, stencils, and I must confess, remove aluminum burrs.

"Then there is the *physical function,* requiring that the handle be sufficiently long to reach diagonally across the palm. The handle must be a balance between one that is sufficiently thick to distribute the strains of cutting over enough surface of the hand and be thin enough to communicate the 'feel' of the work being done.

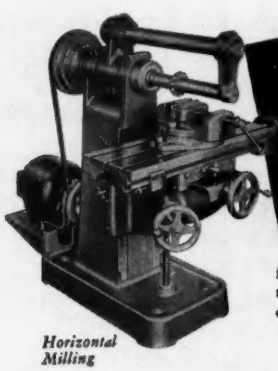
"The cross section of the handle must be other than a circle because one must sense the direction of the blade. Remember: Your hand is more accurate than the eye when it come to whittling. Squarish sections, sharp corners, and blisters are 'old buddies.'

"Finally there is the third function, and possibly most important function, because the knife is being designed for use by humans, the *psychological* or *cultural function.* The knife must look sufficiently like a knife to be recognized as one: New designs evolve to new forms and shapes. You should grasp how to use a knife by just looking at it. The blade must seem sufficiently strong and seem adequately attached to the handle, it must not look like a scalpel blade tucked into a pickle. The blade and the handle forms should be so well integrated that they create the feeling of a single unit though composed of separate parts and different materials."

Q. How would you make such a knife?

A. "Again, I would use the simplest and easiest approach. I would make the knife from a file of good quality, grinding one end for the blade and shaping the remainder for the shank. I would do the grinding slowly enough to save the temper. Since I would attach the blade to the handle with rivets, I would have to anneal the shank for drilling. This can be done by bundling the blade portion in wet asbestos while heating the shank.

"Though there are hundreds of ways of making work knives, there are but a few that will require less than an hour from start to finish. Yes, I must admit we break a knife such as this once in a while, but a tool is to be used and not cherished." ★



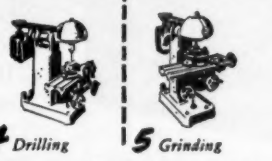
One BENCHMASTER ANSWERS Five EVERY-DAY SHOP REQUIREMENTS

Your little Benchmaster pinch-hits for almost any tool in the shop, saving time, eliminating the need for extra machines, cutting your costs to the bone.

Horizontal Milling

With its two interchangeable spindles, *Benchmaster* mills both HORIZONTALLY and VERTICALLY; serves as a GRINDER, DRILL PRESS or LATHE. In fact, BENCHMASTER is almost a complete shop in itself!

2 *Vertical Milling* 3 *Face Turning*



4 *Drilling* 5 *Grinding*

Good, husky spindle construction with Timken Tapered Roller Bearings is one answer to Benchmaster's extra versatility. Built to .001" tolerance, Benchmasters are precision fitted in every part, assuring surprising accuracy and metal-removing ability —whether it's *milling, drilling, turning or grinding!*

GET THE FACTS ON BENCHMASTER NOW!

Write for circular.

benchmaster — World's largest manufacturer of small punch presses and mills.

1835 West Rosecrans Ave.
Gardena, California

PARENT METAL PRODUCTS

Electrical Test Bench

No. 72-24ETB

COMPLETE COURSE OF INSTRUCTIONS FURNISHED WITH EACH ELECTRICAL TEST BENCH

This 3 'n 1 compact unit consists of a 5 compartment steel cabinet base, a 1½" thick lebonite bench top and a complete test panel. Base is 72" long, 24" deep and 32½" high. Panel is 22" high. A variety of base arrangements are available. Equipment includes a power pack with variable AC and DC voltage, 3 AC meters, 2 DC meters. 2 polarized duplex receptacles and 4 sets of test leads.

Send for your FREE School Shop Equipment Catalog TODAY.

PARENT METAL PRODUCTS
INCORPORATED
6801 State Road Dept S-121 Philadelphia, Pa.

FAMOWOOD ... *the AMAZING* ...

ALL-PURPOSE PLASTIC for wood finishes!

APPLIES LIKE PUTTY . . . STICKS LIKE GLUE!

FAMOWOOD is the answer . . . where wood finishes are important. Simple to use . . . efficient, lasting, time-saving, when filling wood cracks, gouges, nail and screw holes or correcting defects. CAN BE USED UNDER FIBERGLASS. Dries quickly, doesn't shrink. Stays put under adverse conditions. FAMOWOOD sands easily, does not gum up sander. Takes spirit dye stains freely. Waterproof and weatherproof when properly applied. Ready to use—"right out of the can." 15 matching colors, with amazing matchless wood finishes.

USED BY FURNITURE MFGS. • SASH AND DOOR MFGS. • CABINET MAKERS • CONTRACTORS • BOAT BUILDERS • PAINTERS • AIRCRAFT PLANTS • PATTERN SHOPS • HOME BUILDERS • ALL WOOD PRODUCTS

FAMOWOOD descriptive literature & price list on request. Distributor & Dealer inquiries invited, write Dept. SS-4

BEVERLY MANUFACTURING COMPANY 9110 SOUTH MAIN STREET LOS ANGELES 3, CALIF.

Manufacturers of...FAMOWOOD • FAMOGLAZE • FAMOSOLVENT

TRUE PRECISION at LOWEST PRICE

SUPREME MICROMETER

0-1" by thousandths
Accurate to .0005"
Beautiful, dull chrome finish
Clean, accurate markings
Excellent design

ONLY $9.95

Complete with Polyethylene pocket case

100% American — made

Made by
CENTRAL TOOL COMPANY
473 Wellington Ave., Cranston 10, R. I.

EASY TO COMPLETE FISHING ROD AND ARCHERY KITS — AGE GROUPS FROM 12 to 18 YEARS.

Free, illustrated step by step literature available to all shop teachers on all projects. Archery Kits priced from $2.25 to $11.50. Fishing Rod Kits priced from $2.87 to $5.99. Postpaid.

OLD PIONEER ARCHERY
P. O. Box 36
Mishawaka, Indiana

BILLINGS

Since 1869
TOOLS & FORGINGS of Quality

WRENCHES & SHOP TOOLS

BOOKLET GLADLY SENT

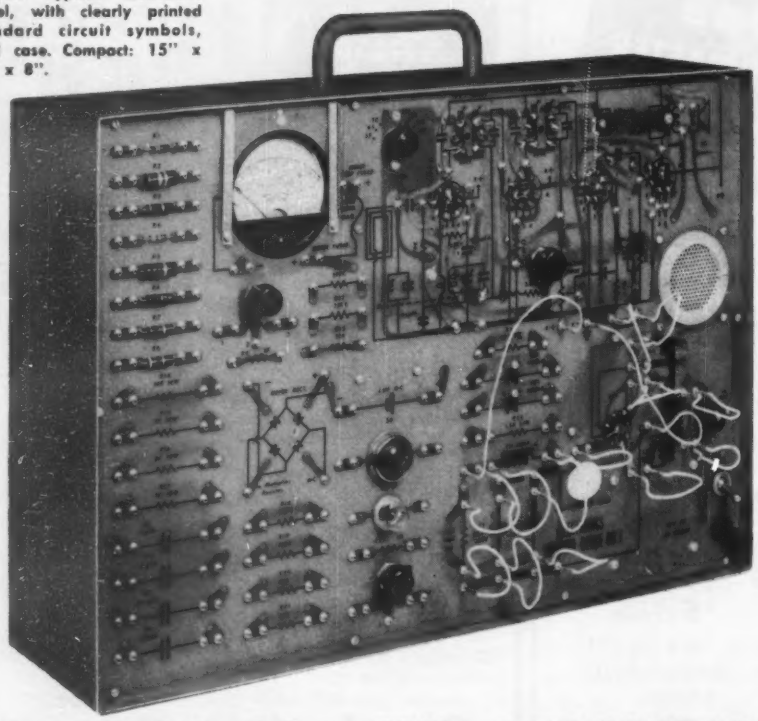
• *More Skill in Every Hand*

ASK YOUR BILLINGS DISTRIBUTOR

Vitalloy Forged
ENGINEERS
15° ANGLE
DOUBLE HEAD

THE BILLINGS & SPENCER CO.
HARTFORD 1, CONN., U.S.A.

FRONT: Typical electronics panel, with clearly printed standard circuit symbols, steel case. Compact: 15" x 21" x 8".

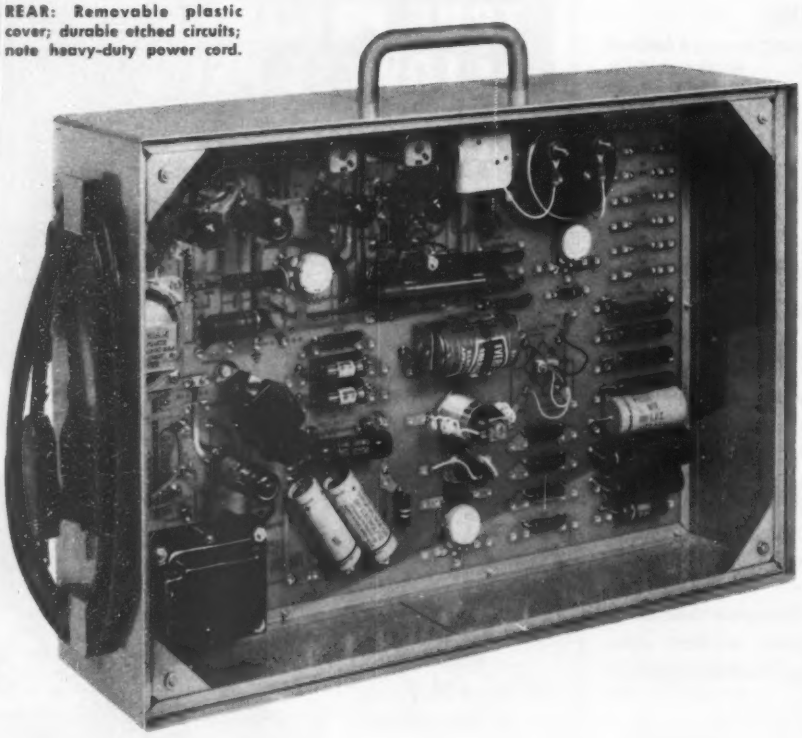


■ Plan your electronics courses now with MONITOR simplified Electronics. Build your program from a series of 40 classroom-tested instruction panels, coordinated with student texts, teachers' guides, and lab manuals for 1- 2- or 3-year courses. All MONITOR equipment is NDEA-approved (under Title III, Science Education, and Title VIII, Technical Education).

■ Each ruggedly constructed, modular training panel is completely self-contained, ready to help the teacher in science or physics classrooms, lab or shop. The lightweight portable panels plug into regular 110-volt outlets. No building alterations are necessary.

Start with Simplified MONITOR® Electronics

REAR: Removable plastic cover; durable etched circuits; note heavy-duty power cord.



■ With MONITOR simplified Electronics, you can select only the equipment you need, with the aid of experienced electronics teachers. Nationwide distribution by the producers of famous MONITOR Electronic Language Laboratories. Write for course outlines, planning costs, free catalog and the name of your area distributor.

ETL

ELECTRONIC TEACHING LABORATORIES

5034 Wisconsin Avenue, N.W.
Washington 16, D.C.

On Display 1961 AVA Convention - Booth 24

ATEA Program Highlighted

. . . and other news items

". . . too much junior-college technical training has imitated professional schools on a watered-down basis or copied high-school courses with an up-grading of content. . . ."

HIGHLIGHTS of the American Technical Association's convention program which will be held at the Hotel Muehlebach, Kansas City, Mo., Dec. 3-5, follow:

Dec. 3, 3 P.M. to 5 P.M.: Meeting of the ATEA officers, trustees, and advisory council.

Dec. 3, 8 P.M.: "A Look Ahead in Technical Education" with Walter J. Bartz, association vice-president and chief of technical education in Illinois, presiding. Appearing at this session will be Walter M. Arnold, acting assistant commissioner for vocational education and director of the area vocational education branch of the U.S.O.E.; and Laurence L. Jarvie, president of New York City Community College, Brooklyn.

Dec. 4, 9 A.M.-11 A.M.: "Plans for Expanding Technical Education," with Roy W. Dugger, Oklahoma state supervisor of technical training services, serving as chairman.

Dec. 4, 12:15-1:30 P.M.: The ATEA luncheon meeting will be addressed by Harry Bigelow, employment manager, Argonne National Laboratory, Argonne, Ill. His topic: "The Need for Technical Education to Meet State and National Economic Security."

Dec. 4, 2 P.M.-4:30 P.M.: "Meeting the Challenge" with William N. Fenninger, executive secretary of the ATEA, serving as chairman. Some of the subtopics that will be reported on at this session are "What Industry Expects of Technical Institute Graduates," "Canada Meets the Challenge of the 60's," "Automation and the Technical Institute," and "Meeting Needs for Technical Education through Extension Classes."

Dec. 5, 2 P.M.-4:30 P.M.: A joint meeting with the National Association of Industrial Teacher Educators. Rupert N. Evans of the University of Illinois, president of the NAITE, will be chairman. The convention is meeting in conjunction with the American Vocational Association's annual convention at Kansas City.

●

THE Russian government, through a bureau called Gosplan, sets up personnel quotas for all occupational fields on a five-year basis and adjusts these quotas annually to meet any shortages of skilled and technical workers and to realize their long-term planning.

This was a major observation made by F. Parker Wilber, president of Los Angeles Trade-Technical College, following an 8,000 mile study he made of the Soviet Union's technicums manufacturing plants, and on-the-job training areas with a group of educators.

Mr. Parker reported, too, that the Russians are training 30 percent more technicians in their technicums and other specialized secondary schools than are being trained in the United States. "Approximately 80 to 85 percent of these technicum students are on some kind of monthly stipend," Mr. Parker continued. "The stipends generally approximate 25 to 30 percent of the salary a technician receives when employed in industry," he added.

He noted that although the school buildings were often in a poor condition, the laboratories contained "so much up-to-date equipment that they could be considered small industries in themselves."

President Wilber was part of a six-man, East-West cultural delegation. Other educational strong points noted by the team were: (1) exceptionally high admission standards; (2) students attend school for 36 to 42 hours per week, six days a week; and (3) Soviet educators, although they do not believe in psychological testing of candidates, nonetheless appear to be able to get the right kind of student.

The American visitors noted that among the weaknesses are the following: (1) some of technicums are really miniature engineering schools; (2) there is a lack of training in the manipulative skills; (3) no production training; and (4) the assistant teachers who teach the lab courses are of inferior caliber to the classroom teachers.

Mr. Wilbur said there is virtually no type of follow-up of the students so that the educators cannot establish to what degree their specialized courses are failing or succeeding.

●

GERALD F. ULRICH and Edith Doi, of the Colorado state department of education's division of guidance services, have prepared a 22-page booklet titled *Guide to Vocational Training Opportunities Beyond the High School.*

(*Continued on page* 33)

"Over-the-shoulder instruction" is just not enough

Technical Education in the Public Schools in Washington

By Ralph E. Dever
Supervisor, Trade and Industrial Education,
State Board of Education, Olympia, Washington

TECH-ED

SAWING logs into lumber has become a highly skilled occupation. I find that employment at easily learned jobs, work which was available to me in lumber mills during my college holidays and vacations, is not available any more. Back in those days there were plenty of jobs—most of them requiring about 15 minutes of over-the-shoulder instruction—for any young fellow with strong hands and a strong back.

The other day I visited one of the modern sawmills in Southwest Washington. My first astonishment occurred at the slip where the logs are brought out of the water and up into the mill. I saw a log being buffeted about by very powerful jets of water. It was quickly losing its bark. It was explained that this bark removal greatly improves the head sawyer's vision in studying the log for cutting and eliminates accidents by removing rocks before they reach the saw. The chunks of bark, flushed away, were saved for other uses, instead of going to the "slab pile" for burning—no part of the log is wasted now.

Then I saw the head-rig. This is a moving platform on which the log is securely held as it is forced into the saw so that the log is cut length-wise into thick cants or slabs. These cants are later cut into timbers and boards on another rig, which is called the pony-rig. The sight of this head-rig caused my second astonishment—there wasn't a person riding back and forth on it. I had earned good money to help me through college "doggin' on the head-rig," and no one was earning any money riding that rig now. The operation of attaching hooks onto the log and of clamping the log down tight onto the rig was being done by the head sawyer in his little booth by simply pressing electronic buttons and switches.

No Canthooks or Pickaroons

The physical ease with which operations in the rest of the mill were performed was equally "strange" to me. I looked hard to see a canthook or a pickaroon, but I didn't see one. Electronics, hydraulics, and pneumatics have done away with them and have eliminated the human labor they represented.

On another day in that same part of our state, I sat in with a group of young to middle-aged men observing their participation in a course about sawing up logs. These men were now off-shift from their jobs in a sawmill. They obviously were getting the technical knowledge they wanted. Their attention to the instructor (an old hand at the modern lumbering game) and to the visual aids (the best available, right out of the industry) showed this. These adult students are among a fairly large group of men, enrolled at a junior college in a course of study leading to an Associate of Arts degree in Forest Products. It will take them four to six years to complete the equivalent of a two-year college program, but they want this extra knowledge about their industry, and they are determined to work for it outside of "working hours." This is a form of technical education.

How much change there has been in industry, and in its workers, since the time when most sawmill hands needed only fifteen minutes of over-the-shoulder instruction to do satisfactory work!

This interest on the part of people already working, to improve their skills and to expand their knowledge in their own occupational fields, is one of the astonishing developments in modern industrial and technical education. For instance, in this state alone, last year, 50,000 men and women in skilled industrial occupations enrolled in several thousand vocational-technical public school classes, determined to improve their techniques and increase their technical knowledge—to the advantage of our industries. That is about 10 percent of all of our state's industrial workers. Among the highly skilled workers in the more technical occupations, the percentage is still higher.

Washington Ranks First

In the last two years for which national figures are available, the state of Washington has ranked first among all states in percentage of skilled workers enrolled in evening extension classes.[1] Incidentally, six of the first ten states are western states.

On a recent Saturday at a junior college in Eastern Washington, I watched and listened for several hours while a dozen skilled electrical linemen were being instructed in the electrical industry's latest cable-splicing techniques. These men work with primary electric lines that must carry extremely high voltages—not the 110 found at your light bulb, nor even 5,000 v, but in the ranges up to 250,000 v. The greater use of aluminum instead of copper, and its use in conjunction with copper, and the amount of plastics and special resins coating and separating this stranded electric cable, requires a knowledge of metallurgy and plastics never before required of an electric line construction man. The instructor estimated that these men can be brought up to date in cable splicing in about 150 clock hours of classroom and laboratory instruction. One of the major companies supplying electric cable had two of their engineers present and helping the instructor on points concerning their own products. Other companies in the electric power and equipment field have assisted on other Saturday classes.

To get back to the title of this article,

[1]Digest of Annual Reports to USOE, Division of Vocational Education, fiscal years 1958 and 1959.

just how technical do we mean by the word "technical"? What technical elements must be present in a man's work for him to be titled a "technician"? It is clear that the technician is not a professional-level person, such as an engineer or scientist. However, a person with the title of technician in the engineering field must know how to do much of the drafting, the calculating, the routine surveying and planning for the professional engineer, while working closely with him and putting his ideas into practical, workable form. In a similar manner, the laboratory technician must work closely with the chemical engineer, and the electrical-electronic technician with the electrical engineer. To whom the title of technician shall go will actually be decided by the employer—the man who describes the work of the job and the training and experience necessary to qualify for hiring. The best we educators can do is to waste no time quibbling over the terms "technical," "technology," and "technician," and get on with the education and training of the kind of workers at all levels demanded by our space-age industry.

The Committee

This brings up for discussion an important part of any vocational-technical education program—the representative advisory committee. Management leaders, representative of an industry, and employes, representative of the workers in that industry, must be asked by school people to sit down as an advisory committee and tell them the occupation, or occupations, for which training is needed—and when the training is not needed. This committee could give the school a broad outline of the work of the occupation—for its members would know it as it is today—the skills and the technical information needed by workers in the occupation and the occupational competency which the school should require of the instructor. The committee might even suggest several persons in the industry from whom the school administration could select an instructor. The committee would be very helpful in planning shop space, equipment and supplies, and meaningful work for the students to help them gain the required entering-employment skills. The committee's advice on selection criterions for students enrolling in the day and evening courses should be followed and its advice and assistance requested in the employment of graduates of the day program.

All of the 10 junior colleges gave some technical training, the largest programs among them being at Clark College, Vancouver; Columbia Basin College, Pasco; Lower Columbia Junior College, Longview; Olympic Junior College, Bremerton; and Everett Junior College, Everett. However, six technical schools on the extended secondary level enrolled the largest number of day and evening students, for they are located in the large industrial centers. Edison Technical School in Seattle had by far the most, enrolling nearly 19,000 persons, in both day and evening classes. Tacoma Vocational-Technical Institute in Tacoma; Spokane Technical and Vocational School in Spokane, and Renton Vocational School in Renton, enrolled about 7,000, 5,000 and 4,000 respectively in day and evening classes.

Classes Listed

The aircraft industry, being one of the largest industries in the state, had the most workers enrolled and the greatest variety of class titles, some of which were: aerodynamics, blueprint reading, calculus, drafting, electronics, electronics mathematics, expediting, foremanship and supervision, guided missiles, layout and lofting, metallurgy, optical tooling, preflight, production planning, and tool and die making. Closely allied to this industry, for the operation of aircraft, were classes in: aircraft instruments, airframe and powerplant mechanics, airline electronics and commercial flying. Following are a few of the class titles used in the shipbuilding industry: boat-building and ship's carpentry, electronics, electronics mathematics, foremanship and supervision, machine shop, naval architectural drafting, optical tooling, sheetmetal layout, shipfitting, and welding.

The building and construction industry had classes with such titles as: architectural drafting, blueprint reading, cabinetmaking and millwork, carpentry, electrical code, electricity, engineering aides, first aid and safety, foremanship and supervision, glass cutting and installing, linoleum, carpet and tile laying, painting and decorating, plumbing and pipefitting, sheet metal layout, and welding. For the metals industry there were classes in: boilermaking, foremanship and supervision, foundry work, machine shop, metallurgy, sheetmetal layout, tool and die making, and welding.

Increased enrolment has been developing the last few years in the electrical-electronics industry; some of the classes held last year were: appliance repair, electric line construction, electric wiring, electronics, electronics mathematics, industrial electronics, radio and television repair, cable splicing, television broadcast electronics, and transistors. In the allied field of communications there were classes in: FCC license preparation, telegraphy, telephony, and television studio telecasting. For the automotive industry some of the classes included: auto body repair, auto mechanics, carburetion and ignition, diesel mechanics, and transmissions.

Even School Bus Driving

In the field of personal and public service, some of the courses were: barbering, beauty culture, commercial cooking and baking, custodial work, dental assisting, dry cleaning, fire fighting and fire prevention, furniture upholstering, police training, practical nursing, school bus driving, and tailoring. For the printing and publishing industry, there were such classes as: advertising art, photography, photo offset printing processes, and printing.

The pulp and paper industry, the oil refining industry, and several other industries, which use automatic control systems, employed graduates of the two programs in industrial instrumentation, located in Tacoma and in Longview.

There was a time when anyone over 16 years of age who showed an interest in taking a course in a vocational school could enrol in any course he chose, if there was room for him in the class. The communication skills, the mathematical computation skills, and the ability to picture an idea on paper, which are now required in these new technical occupations, are forcing technical schools into a testing and guidance program for their enrollees. A high-school diploma is neither a requirement, nor does it provide an automatic admission to technical-school courses. Counselors who are familiar with industry's work needs, and are skilled in vocational guidance work, now test prospective students and help them to enrol in a course leading to the occupation in which they are most likely to be successful and happy.

Placement in the occupation for which a student is trained, and his satisfactory progress in the work of the occupation, are twin objectives of technical education in the state of Washington. ★

(*Editor's note: This article is reprinted from the* College of Education Record, *May, 1961, issue of the University of Washington.*)

TECH·ED

TECH-ED

been released as part of Title V-A of the Education Act.

for this booklet came in response to Colorado requests for information concerning training as career opportunities for those interested in training technicians.

●

ALGO D. HENDERSON, director of the University of Michigan Center for the Study of Higher Education, said recently that too much junior-college technical training has imitated professional schools on a watered-down basis or copied high-school courses with an up-grading in content.

Mr. Henderson named four handicaps which junior colleges need to overcome: (1) many of the courses that have been established have not been sufficiently founded on data collected through occupational analysis; (2) in many instances inadequate provisions have been made for laboratory or other experiences; (3) nearly all institutions have experienced a dearth of teachers who are well trained to teach the particular specializations; (4) in some instances the senior colleges and universities have not had a good understanding of what the two-year colleges were endeavoring to do in this area and so have not given them encouragement and support.

●

THE Labor Department has announced that six new occupations have been added to the critical list used in screening personnel for assignment to the Standby Reserve. Among the six new occupations listed are engineering and physical science technicians.

In announcing the changes, the department explained that the list serves as a guide for transferring personnel with critical civilian skills from the Ready Reserve to the Standby Reserve. Under present law, the personnel in the Ready Reserve may be called to active duty at the option of the President and the Defense Department, but those in the Standby Reserve cannot be called without further Congressional action.

For information about the Department of Labor List of Critical Occupations for Screening the Ready Reserve, write to the Secretary of the Interagency Committee, Bureau of Employment Security, U. S. Department of Labor, Washington 25, D. C.

●

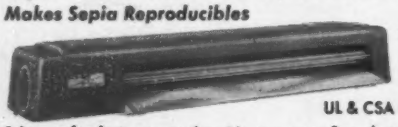
THE Employer's Inventory of Critical Manpower, which is available from the Engineering Manpower Commission of the Engineers Joint Council, 345 E. 47th St., New York 17, N. Y., provides a quick analysis of the probable liability for military service of male personnel. Other information in the "Inventory" that should be of interest to counselors and administrators is: (1) the proportion of engineering and scientific personnel immediately subject to call to military service and those less vulnerable; (2) the proportion of technological personnel now engaged in essential activities; (3) those areas where men may be improperly classified by Selective Service Boards because of a lack of adequate information. ★

NEW BLU-RAY Whiteprinter offers 50% MORE SPEED!

MAKES CLEAR DIAZO PRINTS IN SECONDS FOR PENNIES!

Copies anything printed, typed, drawn or written on any translucent material. Just slide Tracing and Diazo Paper thru BLU-RAY. Get FAST, EXACT EXPOSURE.

Makes Sepia Reproducibles



From $197.50 All Prices Eastern List

UL & CSA Approved

3 Lamps for faster operation. No warm-up. Speed control for exact exposure. 3 Models: 14", 27", 42" print width capacities: any length. Portable.

Thousands of Guaranteed BLU-RAYS in use not because they're the cheapest, but because they're the best, most reliable dollar value. Get a demonstration and see for yourself.

AVAILABLE ON LOW COST MONTHLY LEASE PLAN

NOW BLU-RAY OFFERS 2 DIAZO DEVELOPERS

1. NEW FLUTED SEE-THRU AMMONIA DEVELOPER TUBE. FROM $11.55

2. NEW CONTINUOUS ROTARY DRY DEVELOPER FOR FASTER DEVELOPING.

For use with BLU-RAY and other Rotary Diazo Whiteprinters.

3 Models from $129.50

SEND FOR LITERATURE OR DEMONSTRATION IN YOUR OFFICE

BLU-RAY by R.E.C. Reproduction Engineering Corporation 1 Westbrook Road, Essex, Connecticut

Partners · · · · YOU AND YOUR NO. 50 POCKET PAL

$1.00 AT YOUR LOCAL DEALER

CATALOGUE NO. 49 AVAILABLE UPON REQUEST

.030 MATTE FINISH MATHEMATICAL QUALITY DOUBLE-CURED PLASTIC. ALL HOLES SMOOTH-MILLED TO ENGRAVING MACHINE ACCURACY

ONE OF MORE THAN 30 RAPIDESIGN TIME-SAVER TEMPLATES – ALL OF WHICH ARE BETTER MADE, MORE USEFUL AND LESSER PRICED

RAPIDESIGN INC.

P. O. BOX 592 GLENDALE, CALIF.

transpaque

The Transpaque Overhead Projector has 5 major exclusive advantages. Each of these features makes learning more effective.

5 major advances

1: BRIGHTEST OF ALL... allows brilliant reproduction in fully lighted room. 2: LOWEST SILHOUETTE ...you see your entire audience, your audience sees all the screen. 3: AUTOMATIC LAMP CONTROL... light goes on when slide is inserted, goes off when removed. 4: FLAWLESS SCREEN IMAGE... gives clear undistorted picture from corner to corner. 5: NON-GLARE WRITING SURFACE... gives complete eye comfort and safety, even after hours of use.

Write for a Free Demonstration or for the Free Booklet: "5 Major Advances in Overhead Projection"

Projection Optics Co., Inc.

271-82 ELEVENTH AVENUE, EAST ORANGE, NEW JERSEY

In Canada: — Anglophoto, Ltd. 880 Champagneur, Montreal, Quebec

this year

ALL YOU HAVE IS 1,000 HOURS

You have only 1,000 hours each year to spend with your students. How can you teach them all they have to know? See the 10 minute film "1,000 Hours". It graphically explains some of your critical problems—offers possible solutions.

It is an important document, narrated by Milton Cross. You may see it free at your own convenience in your school. Simply mail the request for an appointment.

PROJECTION OPTICS CO., INC.

271-82 Eleventh Ave., East Orange, New Jersey

I would like to see the 10 minute film "1,000 Hours". My most convenient day is_____, time_____

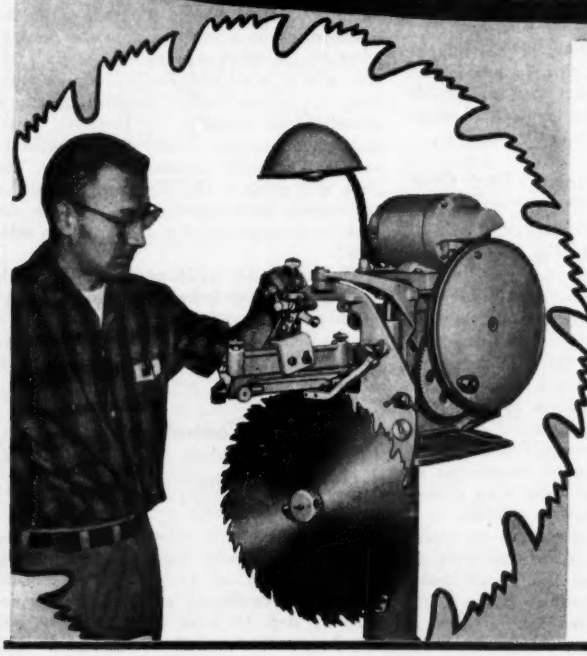
Name _____

School _____

School Address _____

City _____ Zone __ State _____

COMBINATION SAWS can now be *filed automatically* with the New Model 200 FOLEY *Automatic* SAW FILER



This is the FIRST and ONLY machine which will file the so-called "combination" (rip and crosscut) circular saws; also crosscut circular saws, band saws, all types of hand saws.

The new model 200 Foley Saw Filer not only keeps all saws in perfect cutting condition at low cost, it also is a great asset in training students in the correct care and maintenance of hand and power saws. The exclusive Foley principle of jointing the saw as it is filed, keeps all teeth uniform in size, shape and spacing; keeps circular saws perfectly round, usually doubles saw life.

FILES CIRCULAR SAWS

Files and joints combination and crosscut circular saws 4"–24" in diameter with 3 or more points per inch.

FILES BAND SAWS

Files and joints band saws up to 4½" wide and up to 24' long with 3 to 16 points per inch.

FILES HAND SAWS

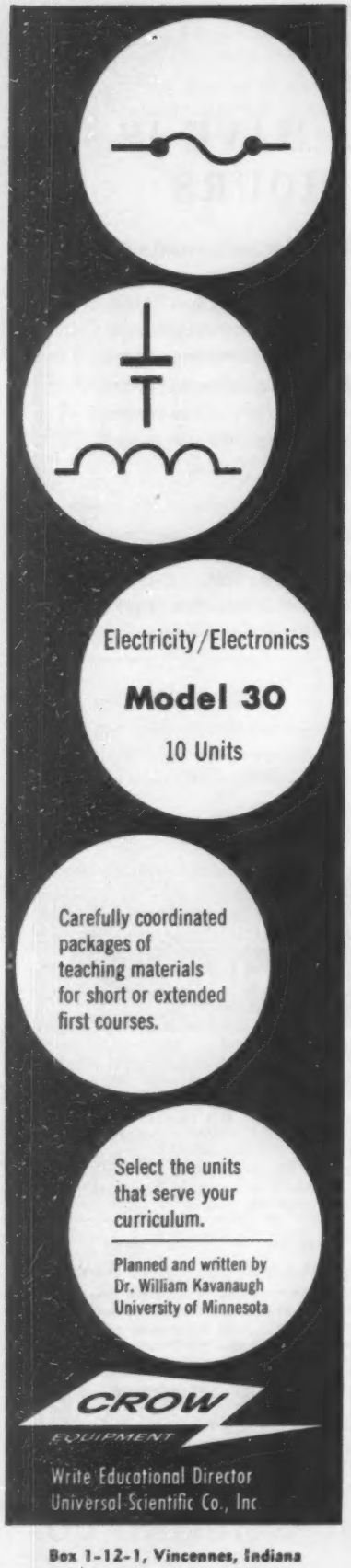
Files and joints all hand, back and miter box saws with 3 to 16 points per inch.

30-DAY TRIAL OFFER

You may try the new Model 200 Foley Saw Filer in your own shop for 30 days. See for yourself its precision work, advanced design and quality construction—time-proved through more than 50 years. Write for literature and details of 30-day trial offer.

FOLEY MANUFACTURING CO.

3316 N.E. 5TH STREET MINNEAPOLIS 18, MINNESOTA


Electricity/Electronics
Model 30
10 Units
Carefully coordinated packages of teaching materials for short or extended first courses.
Select the units that serve your curriculum.
Planned and written by Dr. William Kavanaugh University of Minnesota
CROW EQUIPMENT
Write Educational Director Universal Scientific Co., Inc
Box 1-12-1, Vincennes, Indiana

instructional Resources

Books:

Modern School Shop Planning. (Third Edition.) Ann Arbor, Mich.: Prakken Publications, Inc., 1961. Pp. 221. $4.50.

This revised edition provides a comprehensive source of practical information on all aspects, including purchasing, for planning, and equipping the school shop.

There are sections on planning and equipping shops for: general shop, automotive, drafting, electricity and electronics, graphic arts, machine shop, metalworking, woodworking, and technician training. The information is up-to-date, reflecting interests and developments since the publication of the second edition in 1957.

The planning articles contain practical advice and guidance, dealing with the multiple complex problems peculiar to the nature of the various shop areas that the novice or layman cannot even anticipate. Here, perhaps, is the book's major contribution: As a shop-planning guide, it should serve to avoid the building-in of expensive, annoying, and enduring problems so frequently found in school shops.

There are detailed tool and equipment lists for shops and programs ranging from the kindergarten to post-high-school technical courses. The lists make suggestions as to quality and quantity of tools and equipment according to grade level and class size for all shop areas. For example, in the graphic arts area the lists extend from linoleum block printing at the lower elementary level to letterpress and offset printing in a vocational-school unit shop.

The lists for other shop areas are equally complete.

There is a generous use of photographs and illustrations. Overall, this is a broader and more thorough presentation than earlier editions of this unique and popular planning book.

Interior Electric Wiring; Part One, Residential. (Sixth Edition). Graham. Chicago: American Technical Society, 1961. Pp. 311.

The publishers say that the rapid development of new products and improved practices in the home-wiring industry make it necessary to periodically revise this book.

"The home of today," the publishers state in the preface, "is becoming a marvel of complexity with its use of modern products such as motors, speaker systems, remote control of lighting, heating, and other functions. The successful electrician can no longer rest on what he has learned—he must keep abreast of what is new in the field to compete. . . ."

The book presents information to enable the electrician to keep up to date with his trade. Content progresses from basic theory through the different types of wiring to the latest developments in the field. Helpful illustrations are used generously.

Kenneth C. Graham, an electrical engineer, is consultant to the apprenticeship instruction materials laboratory of the Bureau of Trade and Industry, California State Department of Education.

The Machining of Steel. (Second Edition.) Lea and Simons. New York: Macmillan Co., 1961. Pp. 208. $5.00.

This is a handbook designed for students, apprentices, and others interested in engineering production.

The fundamental principles of cutting and shaping steel and its alloys are presented with much practical information on the machines and methods used.

The text has been fully revised, new illustrations have been prepared, and material has been added to bring the contents up-to-date. Included is an account of the recent development of electro-spark cutting of hard metals.

The content is arranged in chapters dealing with the basic machine tools: lathe, planing and shaping machines, milling machines, etc.

Mechanization of Motion. Harrisberger. New York: John Wiley and Sons, Inc., 1961. Pp. x + 363. $8.50.

This book developed from an experimental teaching program designed to provide undergraduate students with a basis for creative decision making in machine design.

The author, Lee Harrisberger, professor of mechanical engineering at North Carolina State College, writes in the preface:

"I have organized the text as a discussion of the opportunities and alternatives in the development of a creative approach to machine design which are available to an engineer who is faced with his own unique problem. . . . I have avoided compiling merely a miscellaneous collection of theorems, facts, and techniques, and I have not attempted to catalog ingenious mechanical devices. The book is a guide to the literature, a guide to the criteria for decision, and a guide to the creative development of a unique design solution."

The author has organized the fundamentals of kinematics, the techniques of ideation, and techniques for synthesis and analysis into a step-by-step discussion of procedures for synthesizing the solution to any motion requirement.

A-C Motor-Control Fundamentals. McIntyre. New York: McGraw-Book Company, Inc., 1960. Pp. vii+248. $595.

While this text is written in nontechnical language, the reader has to possess a working knowledge of basic electrical theory. Methods of developing circuits are explained step by step. In order that the reader may develop a background for applying these

for bending sheet metal

Hand Operated

CHICAGO Universal Box and Pan Brakes

Many Floor Models, Capacities 3 to 10 Feet and up to 12 Gauge

3 Bench Models, Capacities 24, 30, and 36 Inches—16 Gauge

Within its size and capacity, a CHICAGO Box and Pan Brake offers all the features needed for the practically limitless variety of bending operations in sheet metal work. Besides the regular and reverse bends, boxes and pans can be formed from one piece of metal. Also, with special bars readily interchangeable, radius bends and tubular shapes can be made.

It pays to teach sheet metal bending with CHICAGO Brakes as these machines are universally used in industrial and sheet metal shops.

8243

CHICAGO

Press Brakes • Straight-Side-Type Presses • Press Brake Dies

Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP

MANUFACTURING CO.

7454 South Loomis Boulevard, Chicago 36, Illinois

GET YOUR COPY OF McKNIGHT'S NEW

FREE SHOP BOOK **CATALOG**

TEACHERS ATTENTION: EASY DOES IT WITH "TELL HOW" — "SHOW HOW" BOOKS

Now is the time to send for the new McKnight Catalog. It not only gives you a complete listing of text and project books but also briefly describes each one and quotes prices. All books are completely illustrated to make teaching and learning much easier.

- Leather Craft
- Graphic Arts
- Ceramics
- Machine Shop
- Metal Work
- Woodworking
- Photography
- Wood Carving
- Plastics
- Weaving
- Drafting
- Electricity
- Methods
- Projects
- Welding
- Auto Mechanics
- Electronics
- Fabric Decoration

CLIP THIS COUPON

McKNIGHT & McKNIGHT PUBLISHING CO.
Dept. 925, Bloomington, Illinois
Please send your big new catalog to:

Address_____

Name_____

School_____

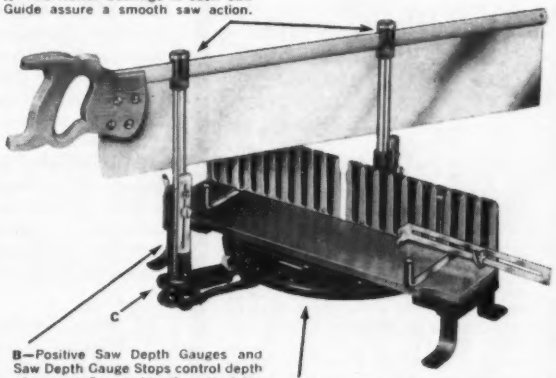
City_____ State_____

Boy-Proof!

STANLEY MITRE BOXES

- Practically unbreakable malleable iron Swivel and Saw Guides.
- Automatic Saw Guide Catches leave both hands free to position work.
- Simplicity of design minimizes adjustment for accuracy.

A—Two Roller Bearings in each Saw Guide assure a smooth saw action.



B—Positive Saw Depth Gauges and Saw Depth Gauge Stops control depth of saw cut. Serrated teeth on Uprights and Stops, together with strong screws, withstand severe use and abuse.

C—Swivel and Uprights cast in one piece from malleable iron . . . strong, rigid and practically unbreakable. Will always cut square to the base.

D—Index Plate graduated in degrees and numbered for sawing 5-, 6-, 8- and 12-sided figures. Double-Locking, Self-Clamping Swivel is fitted with a pin which locks into the numbered index holes. In addition, Swivel may be clamped at any position between these holes.

NO.	BACK SAW SIZE	CAPACITY OF CUT AT 90° —inches—	CAPACITY OF CUT AT 45° —inches—	CAPACITY OF CUT AT 30° —inches—
2244	24" x 4"	8⅛	6	4
2246	26" x 4"	8⅛	6	4
2358	28" x 5"	9½	6½	4⅜

STANLEY®

THE TOOL BOX OF THE WORLD

USE THIS COUPON FOR MORE DETAILED INFORMATION AND SCHOOL SHOP HELP

STANLEY TOOLS, Educational Dept.
7212 ELM STREET, New Britain, Conn.
FREE ( ) Please send me Stanley Tool Catalog No. 34.

Name_____

Subject you teach_____

School_____

Address_____

City_____ Zone_____ State_____

CMC QUALITY CRAFTMETAL

enhances students' chances of outstanding achievement!

ETCHING

STIPPLING

HAMMERING

NEWS FLASH!
COLORAMIC ALUMACRAFTING IS HERE!

Now, you can offer your students aluminum circles in five gorgeous colors.

Send for FREE literature today!

Students' metalcraft projects get the benefit of the best materials obtainable when you supply your classes with our Super-Brite MIRROR-Finish Aluminum and other specially-prepared craft metals. Available in circles (flat or preformed), in rectangles (flat or preformed), in bracelet blanks and other shapes... for etching, hammering, stippling and other treatments... in making trays, coasters, bracelets, medallions, pendants, plaques and many other beautiful and useful items... *Craft Metals Corporation craft metals are tops!*

SAFE-T-ETCH
NON-ACID ETCHING AGENT
a boon to the craft instructor

Safe-T-Etch, our new non-acid etching compound, is growing rapidly in popularity—especially in group work—because it does away with the old hazards and objectionable features of etching with acid. Students are extremely enthusiastic with this safer ...faster...easier way of etching aluminum.

MAIL COUPON TODAY FOR
FREE BOOKLET
AND METAL PRICE LIST

CRAFT METALS CORPORATION
(Formerly Metal Goods Corporation)

CRAFT METALS CORPORATION SD
1610 Hampton Avenue
St. Louis 10, Mo.

(Please print or type)

Name_____

Address_____

City_____ Zone____ State____

School_____

methods, the book presents the possible functions of circuits and the components used in control circuits.

The book is designed for use by apprentices and students, but it should also serve as an excellent reference for servicemen.

R. L. McIntyre is training director for the Electrical Contracting Industry, Houston, Texas.

Pamphlets:

New Driver Road Test and **Mental and Physical Requirements for Driver Licensing in the 50 States** are two publications recently released by the New York University Center for Safety Education.

The driver test is expected to be helpful to driver-education instructors, and it is intended to help in meeting the need for a standardized test. The publications resulted from studies financed by the Shell Oil Company. Inquiries should be directed to the firm, 50 West 50th St., New York 20, N.Y.

American Standard Specifications for Shapes and Sizes of Diamond Grinding Wheels, Hand Hones, and Mounted Wheels, and **Grinding Stresses—Cause, Effect and Control** are two booklets published by the Grinding Wheel Institute.

The first is a 27-page booklet containing information on standard shapes and sizes of diamond grinding wheels as approved by the American Standard Association. Each standard shape of diamond wheel is illustrated and accompanied by a table listing the major dimensions of each standard size in that shape category.

The second title is an 81-page booklet of articles published in the trade press and based on research sponsored by the institute.

Also available is a listing of printed matter available from the institute. The materials are free from the organization at 2130 Keith Bldg., Cleveland 15, Ohio.

'61 Safety Catalog of Occupational Safety Material is a 69-page, multicolor, illustrated catalog listing technical and training materials for implementing safety programs in business, industry, and other occupational areas. Posters, films, slides, etc., are presented. Prices are included.

The catalog is available from the National Safety Council, 425 N. Michigan Ave., Chicago, Ill.

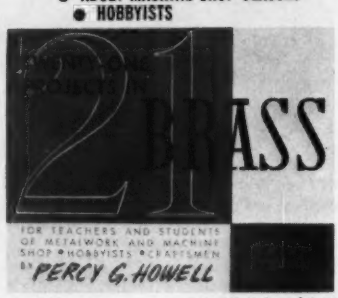
National Leadership Development Conference in Trade and Industrial Education is a 66-page booklet that is a report on a national conference held at Stout State College in August 1960. The booklet, OE-84013-60, is available from the U.S. Office of Education, Division of Vocational Education, Trade and Industrial Education Branch, Washington 25, D.C.

Audio Visuals:

Blueprint for Better Schools is a 16-mm, sound movie in color showing three new concepts in school design. The 22-minute film presents three designs for different sizes and types of junior-high schools. Some imaginative applications of wood are featured. The film is available on a free-loan basis from Sterling Movies, USA, Inc., Central Booking Office, 100 West Monroe St., Chicago 3, Ill.

NEW!

For:
- INDUSTRIAL ARTS METALWORK CLASSES
- INDUSTRIAL ARTS MACHINE SHOP CLASSES
- TRADE MACHINE SHOP CLASSES
- ADULT MACHINE SHOP CLASSES
- HOBBYISTS



Contents:
1. Simple Bud Vase
2. Miniature Log Basket
3. Letter Set
4. Square Candlesticks
5. Don Plaques
6. Brass Door Knocker
7. Cigar Humidor
8. Medieval Wall Plaques
9. Hurricane Lights
10. Heavy Brass Book Ends
11. House or Lawn Sign
12. Dutch Girl Planter
13. Tumbler Ash Tray
14. Spiral Table Lamp
15. Brass Candelabrum
16. Hall or Porch Lamp
17. Desk Set
18. Entrance Lights
19. Cannon Book Ends
20. English Candlesticks
21. Fireplace Andirons

School Price $2.40

Royalle

Publishing Company Inc.
17701 Annchester Detroit 19, Michigan

LAMP and FIXTURE PARTS also COMPLETE LINE OF ELECTRICAL SUPPLIES

For Successful Projects and Maintenance Needs — GEARON CO. is Your BEST Source of Supply

GEARON CO. is Your Guarantee of FASTER and More DEPENDABLE SERVICE—PARTS ALWAYS IN STOCK

Write For NEW No. 11 CATALOG and Price List

FREE TO TEACHERS OF INDUSTRIAL ARTS
Please Send Name and Address of School
Students Send 50 Cents Please

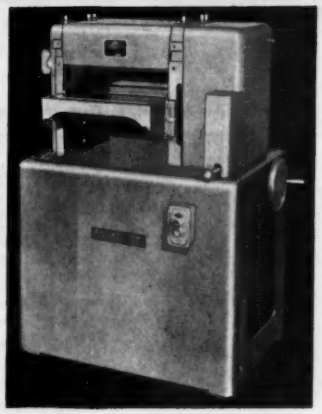
MIDWEST'S LARGEST SUPPLIER OF LAMP PARTS

GEARON CO.
Dept. S. S.
3225 W. 26th Street, Chicago 23, Ill.

New! PARKS 13" PLANER

PARKS 130
13" x 5" Planer
... An Ideal School Shop Machine

This new PARKS Planer gives your students valuable experience operating equipment with the most advanced design. Check these important features: precision ball-bearing-mounted 4-knife solid steel cutterhead . . . four 1¼" diameter table rolls for smoother, more accurate operation . . . two rates of speed—16 FPM and 25 FPM. Also available with knife grinder.



20" THICKNESS PLANER

PARKS No. 20—A modernly designed, rugged, high-speed production surfacer that planes lumber up to 20" wide and 6" thick. Knife grinder available as optional equipment. Write for descriptive literature on the PARKS 12", 13", and 20" Planers, as well as on PARKS wood- and metal-cutting Band Saws, Radial Saws, Planer-Jointer Combination Machines.

The PARKS WOODWORKING MACHINE COMPANY
Manufacturers of Quality Woodworking Machines Since 1887
DEPT. 24, 1546 KNOWLTON STREET, CINCINNATI 23, OHIO

Are You Remodeling Your Shop?

Get Suggestions from

Modern School Shop Planning

(Revised Edition)

Full of ideas you may adapt to your needs. Plenty of pictures, too, for suggestions. Hints on layouts.

• 221 Pages • $4.50

PRAKKEN PUBLICATIONS
330 Thompson St. Ann Arbor, Mich.

HARGRAVE
CLAMPS • CHISELS • PUNCHES
Full Range of Patterns and Sizes

THE CINCINNATI TOOL CO.

WRITE FOR FREE CATALOG

STOCKED BY YOUR LOCAL DISTRIBUTOR

PRO-TECTO-HED FOR GREATER SAFETY and LONGER LIFE
PREVENTS MUSHROOMING

THE CINCINNATI TOOL COMPANY
4059 Montgomery Rd., Cincinnati 12, Ohio

Fine tools that encourage Good Work

ARMSTRONG WRENCHES

If you don't know your local ARMSTRONG Distributor, we will send you the name of one in your area.

An ARMSTRONG Wrench feels right—is balanced. It goes over nuts or screw heads easily, grips firmly without sloppiness, won't round corners—because openings are carefully machined to correct sizes. It's safe, strong beyond need without clumsy bulk—because of superior design and selected steels, heat treated to proper degree of hardness and tensile strength. It's quality finished, ARMALOY (alloy steel) Wrenches in chrome plate with heads buffed; HI-TEN (carbon steel) Wrenches in baked-on gray enamel with heads ground bright . . . all plainly marked for size. All are uniformly excellent tools manufactured under strict quality control, by modern methods, with modern equipment in a modern tool plant . . . 1537 different industrial sizes and types —single wrenches, or sets in metal cases, boxes or rolls . . . each a quality tool. Armstrong Wrenches are "Fine tools that encourage good work."

ARMSTRONG BROS. TOOL CO. 5252 W. ARMSTRONG AVE. • CHICAGO 46, U.S.A.

FOR THE SCHOOL SHOP

BENCHES	MACHINE TOOLS
CERAMIC SUPPLIES	METALCRAFT TOOLS
DRAWING & DRAFTING SUPPLIES	METALWORKING TOOLS
ELECTRICAL SUPPLIES	METALS
FINISHING MATERIALS	PORTABLE ELECTRIC TOOLS
HAND TOOLS	PRECISION TOOLS
HARDWARE	SHEET METAL EQUIPMENT
LEATHERWORKING SUPPLIES	WELDING EQUIPMENT

LUMBER

1-210

PATTERSON PB BROTHERS
15 PARK ROW NEW YORK, N.Y.
YOUR MOST DEPENDABLE SOURCE SINCE 1848

PEXTO FOOT SQUARING SHEARS*

A complete line of foot and power operated Squaring Shears. Built for accurate shearing and years of operating service. Send for bulletins:

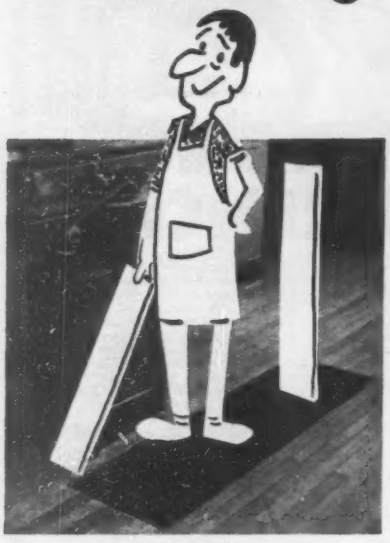
No. 157—Foot Shears
No. 60—Power Shears

A complete line of machines and tools for Sheet Metal Work

*DESIGN PATENT DES175611

THE PECK, STOW & WILCOX COMPANY, SOUTHINGTON, CONN. U.S.A.

FERROX
Prevents Slipping and Falling



EASY TO APPLY
LOW COST • LONG LASTING

Millions of tiny, sharp, abrasive particles in Ferrox provide safe footing even when covered by grease, oil, water, or metal or wood chips—falls and accidents are prevented.

Not only ideal for shops, but used in shower stalls, dressing room areas, and around swimming pools.

Ferrox can be easily troweled into place. It permanently adheres to wood, metal and concrete and is unharmed by oils and chemicals. Just a thin coating is necessary for long, trouble-free life. Less than 1/16" thick, and therefore does not cause trip hazard as you approach safety mat.

Ferrox can be quickly applied without disrupting schedules or classes. The cost is low—one gallon covers approximately 35 sq. ft.

The Navy uses thousands of gallons to prevent slipping on their ships.

Available in four colors—black, red, grey or green. Write today for Ferrox bulletin, Dept 30.

AMERICAN ABRASIVE METALS COMPANY
465 COIT ST., IRVINGTON 11, N. J.

news from Industry

(Circle the numbers on the card in this issue to secure the items listed.)

New Porter-Cable 7" Saw on Market from Rockwell Mfg. Company

A new light-weight, heavy-duty, 7" Porter-Cable power saw, equipped with ball bearings and weighing only 10 lbs., has been announced by the Power Tool Division of Rockwell Mfg. Co.

Labeled the Model 177, the saw will cut to a depth of 2⅜" at 90° and 1⅞" at 45°. It features a built-in shaft lock, for quick and easy blade changes, and conveniently located controls for adjusting cutting depth and angle, plus other improvements, the firm reports.

For further information, *circle no. D-1 on the business-reply card.*

Johnson & Johnson Introduce Pariscraft, New Versatile Art and Craft Material

A new art and craft material, Pariscraft, manufactured by Johnson and Johnson, is now being distributed to the school market by the J. L. Hammett Company.

The material is high-strength surgical gauze with a thin coating of plaster of Paris. After cutting and wetting it is easily molded, draped, or modeled to any shape. It is quick-drying and can be painted, drilled, filed, or sanded. It works well over chickenwire, or nearly any framing material, and minimizes clean-up tasks because mixing, etc. is not required, the company reports.

For complete information, *circle no. D-2 on the business-reply card.*

Remember!
Deadline for Shop Teachers service coupons is February 28, 1962.

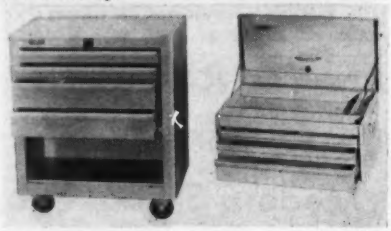
Columbian Vise & Mfg. Co. Markets Mounting Templates for Woodworkers' Vise

New mounting templates for "Wide-Side" woodworkers' vises to permit predrilling and a partial placement of fastening bolts before vises are located are now available from Columbian Vise & Mfg. Co.

The templates, furnished with each V-7 series vise, employ the three-point mounting design. They reduce installation time, assure firm fastening, easy operation, and longer life, the company claims. Mounting instructions and operation and maintenance suggestions are printed on the templates.

For additional information, *circle no. D-3 on the business-reply card.*

New Line of Mechanics' Tool Chests and Stands Introduced by Metal Box and Cabinet Corp.



A new line of tool chests and stands is now being marketed as the "MBC" line by the Metal Box and Cabinet Corporation.

The line includes a wide variety of units, both portable and stationary, with drawer arrangements to meet different needs. Design features include provisions for orderly arrangement and rapid tool inventory. Heavy-duty tumbler locks provide protection. Drawers are nonspill type with full extension runners permitting full opening, according to the firm.

For detailed information, *circle no. D-4 on the business-reply card.*

Stacor Announces Improved Features to Coordinate Group Drawing Furniture

The Stacor Equipment Company recently announced improved developments to the D, D-A, and L series that make up the Coordinate Group line of steel drawing furniture.

The D series of drawing tables, the D-A

2 New Finishes by DONJER

. . . who gave you "SUEDE-TEX" the #1 choice for school shop projects

New—'Hammer-Kote'— Hand-hammered metal look from one single spray.

New—'Color-on-Color'— Exciting multi-color surface from one single spray.

Send for FREE samples and complete catalog featuring Metal Foil, Designs, Adhesives, Lacquers, Paints, Enamel Sprays, and other products recommended and used by shop teachers everywhere.

DONJER PRODUCTS COMPANY
1398 Utica Avenue, Brooklyn 3, New York

PLASTICS
FOR INDUSTRIAL ARTS
Your Complete Supply House
Send for Our Catalog —
15 Years Service to Schools - Teachers
Plastic Products Co., of Utah
Mailing address P. O. Box 1415
2340 S.W. Temple, Salt Lake City, Utah
Frank Delvie, Mgr.

IS YOUR SILK SCREEN PROGRAM BOGGED DOWN???

Then get it rolling again with...

The New Aqua Magic Patented
DIRECT PHOTO STENCIL COMPOUND
Professional results without special equipment or chemicals.

For your introductory sessions use..

Aqua Magic Water Base
SCREEN PROCESS COLORS
BRILLIANT COLORS NO FIRE HAZARD EASY CLEAN UP
FOR FULL PARTICULARS, WRITE DEPT. AM-1.
Lords Sweets PRODUCTS, Inc. 3541 N. KENTON AVE., CHICAGO 41, ILL.

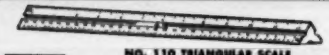
PERFECT PROJECTS

Pre-cut, ready-to-assemble wood-working kits of every description. Over 60 to choose from. Cedar chests, gun racks, tables, water skis, archery sets, bedroom suites and many others.

Write for the new 4-color illustrated catalog.

Giles & Kendall Co.
Box D, Huntsville, Ala.

SAVINGS FOR STUDENT AMERICA



NO. 110 TRIANGULAR SCALE
Inexpensive triangular, 12 inch seasoned hardwood scale. Designed for student use. Black graduations on creme colored background — available in Architect's or Engineer's graduations.
$.55 ea. — $6.00 dz.

NO. 504 "ECONOMY" BOW COMPASS
Polished nickel finish — medium weight for proper balance and easy handling. Circles from 1/8" to 9" diameter — plastic tube contains divider shoulder needle, compass lead and spare parts. Complete in vinyl plastic protective sheath.
$1.75 ea. — $20.00 dz.

WRITE FOR FREE 60 PAGE CATALOG!

• Drawing Sets • Drafting Instruments • Designing Aids
• Drafting Materials • Drawing Equipment • Shop Tools

MODERN SCHOOL SUPPLIES
P. O. Box 958, Hartford, Conn.

series drawing table with integral tool and drawer unit, and the L series, drawing table and reference desk, make up the line. Each series features a foot-pedal control for adjusting the drawing surface through a range of 30" to 45" in height and an angle range from 0° to 90°.

All units feature tubular floor-leveling legs and nonglare, washable work surfaces. The L series employs a color-harmonized reference desk, with large tool and catalog drawers, three electrical outlets, and other features to provide fingertip efficiency, the company states.

For complete information, *circle no. D-5 on the business-reply card.*

Baldwin Industries, Inc., Announces New SpinDisc Sander

A combined sanding unit, a spindle sander and tilting-arbor disc sander with adjustable mitre slide, was announced recently by Baldwin Industries, Inc.

The 3,500-rpm motor will accommodate any tool with a ¼" shank, providing versatility for shaping and sanding operations in wood, plastics, and soft metals. The positive angle setting of disc and mitre slides ensures accurate finishing of joints, etc., the firm claims.

The machine measures 8" x 12" x 8", weighs 16 lbs., and it is rubber-cushion mounted for quiet operation and portability.

For complete information, *circle no. D-6 on the business-reply card.*

Alvin & Company, Inc., Introduces New Draftech Fountain Pen Set

The Draftech fountain pen set, complete with pen, rubber nib wrench, and six interchangeable point sections, was announced recently by Alvin & Company, Inc.

The pen supplies a large, continuous supply of ink and the point sections permit flow, lettering, tracing, or writing with equal facility. A transparent window provides a sight gage to check the supply of ink in the pen and a built-in refill cap prevents ink loss and

COMPLETE
METAL LEG KITS
for school shops

GIVE YOUR STUDENTS' WORK THE PROFESSIONAL LOOK!

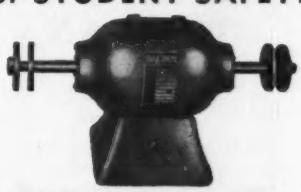
These are the very same legs that fine furniture manufacturers use. Slim and beautifully finished, these legs give tables, hi-fi cabinets, etc., a truly professional appearance.

Complete kits hold 4 legs — square or tapered — in sizes from 3" to 28" in Satin Brass, Pewter, Chrome or Copper finish; 4 brackets that permit straight or angle positioning of legs, and 16 screws. (Wood legs are also available.) Legs are attachable with just a screwdriver.

WRITE TODAY for free complete color catalog, prices and *special school discounts.*

WILKENSON
MANUFACTURING CO.
2918 W Lake St. Chicago 12

SPECIALLY DESIGNED for STUDENT SAFETY!



***Baldor* BUFFERS**

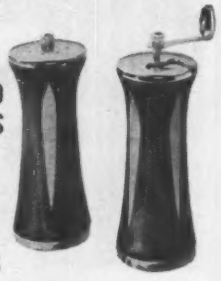
Baldor "safety engineered" buffers meet the diversified demands of young, inexperienced hands. Slow speed (1725 RPM) reduces spoilage —makes learning so much *easier . . . faster!* Helps students do better work. Ideal for soft metals, cellulose materials, plastics. Conventional 3450 RPM also available. Feature for feature, no other buffer offers so much.

- **Even under extreme and repeated overloads, motors won't burn out!**
- **Flanges, wheels, shafts comply with American Standard Safety Code requirements!**
- **Lubricated for life ball-bearings!**
- **6", 7", 8" and 10" sizes!**
- **NEMA construction!**

Write for Bulletin 321R on complete line of Baldor Grinders and Buffers!

BALDOR ELECTRIC CO.
4353 Duncan Ave. • St. Louis 10, Mo.

FOR NEW & DIFFERENT PROJECTS



... GUARANTEED MECHANISMS for PEPPER MILLS COFFEE MILLS NUTMEG MILLS

Looking for new shop projects? Hundreds of instructors have discovered that Pepper Mills, Coffee Mills and Nutmeg Mills make excellent and practical projects. Now you can buy guaranteed mechanisms from the world's largest pepper mill manufacturer. Write today for price information and project sheets.

THE GEORGE S. THOMPSON CORPORATION
727 S. Monterey Pass Road
Monterey Park, California

TROJAN BLADES
Coping • Jig • Hack
Jewelers • Fret
Parker Manufacturing Co.
WORCESTER 1, MASS.

NEW EASY WAY TO TEACH...
STAINED GLASS
no cutting, firing or soldering

Good for all age levels! 19 transparent, brush-on colors (for glass, acetate, foil, metal, etc.) combined with pliable lead authentically simulate leaded stained glass. Available in bulk or demonstration kits.

TEACHERS' TEST KIT Stains, lead, glass, acetate, book only $1.00

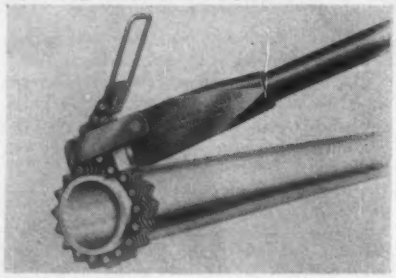
See our ad on page 46 for FREE LITERATURE

IMMERMAN AND SONS
Dept. SS-198 • 1924 Euclid Ave. • Cleveland 15, O.
A-3276

overfilling, according to the company.

For more information about this item, *circle no. D-7 on the business-reply card.*

Chain Strap Wrench Placed on Market by Billings & Spencer Company



A new chain strap wrench available in 15", 24", and 28" lengths, providing capacities from ¾" to 6½", has been announced by Billings & Spencer Company.

Termed the "No. 93," the wrench features a link design and arrangement that provides high holding strength with a smooth grip such that the wrench can be safely used on soft, thin materials and threads, according to the company.

For complete information, *circle no. D-8 on the business-reply card.*

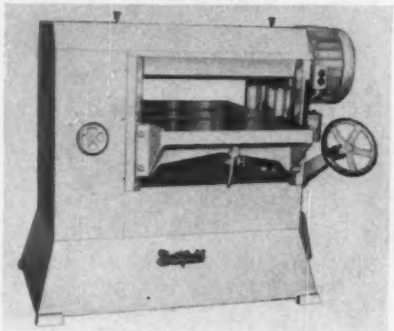
New "Supreme" Micrometer Marketed by Central Tool Company

The Central Tool Company, Inc., announced development of a 0-1" micrometer designed for shop instruction.

The micrometer is made of finest quality materials. It is reliable and accurate to .0005" and is moderately priced, according to the company. It is furnished in a plastic holster for protection which serves as a convenient pocket case.

For additional information, *circle no. D-9 on the business-reply card.*

Northfield Foundry and Machine Company Introduces New Planer-Surfacer



A "No. 7" planer-surfacer, allowing a maximum cut of ½" and capable of handling material 25" wide and from 1/16" to 8¾" thick, was placed on the market recently by the Northfield Foundry and Machine Company.

The machine is available in either a direct

PAULSON BUBBLE Goggles

FULL EYE PROTECTION

Contoured to protect upper face. Optical plastic free of distortion. 100% vision. Feather weight. Adjustable headband. May be worn over glasses. Inexpensive Choice of colors.

Write for Catalog and School Discounts.

PAULSON MFG. CORP.
Fallbrook California

Karle Spin-Shop
Metal Spinning the Safe Way

A complete metal-spinning program, with exclusive, patented safety devices make the Karle Spin-Shop plan safe for all students from grade 7 to grade 12.

Repeat installations in many schools prove reliability of Karle Spin-Shop program.

For brochure, write to:

KARLE SPIN-SHOP CO. INC.
105 State Street • North Warren, Pa.

LEATHERCRAFT

COMPLETE stocks of leathers, kits, tools, supplies, books.

SERVICE is always prompt from our huge inventory. No order too large to handle, nor too small for attention.

REASONABLE prices on all items. Since 1910.

Write for Catalog 62, on your official letterhead

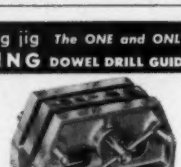
SAX-CRAFTS (Division of Sax Bros., Inc.)
Dept. SS, 1101 N. 3rd St., Milwaukee, Wis

New Catalog of fresh ideas
for project activities in plastics, ceramics, leather, wood, metal.
Handsome desk and project accessories — desk fountain pens, desk balls pens and pencils, swivel-funnel-holders, plus many new items!

Gilbert & Miller INC. 404 FOURTH AVE. NEW YORK 16, N.Y.

"Dowl-it" Doweling jig The ONE and ONLY SELF-CENTERING DOWEL DRILL GUIDE

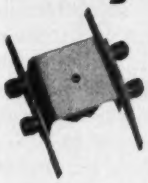
The "DOWL-IT" assures perfect automatic centering and alignment of dowel holes in 5 drill sizes. School shop tested and approved. Heat treated drill guides. 2" jaw expansion. Write for FREE Literature Dept. SS-57



Only $8.95 POSTPAID

"Dowl-It" Company
515 N. Hanover St. — Hastings, Mich.

—WOODSHOP INSTRUCTORS—
Have you heard about
Magna-Set?



• • • • *the magnetic Jointer and Planer knife setter that is rapidly outmoding and replacing the old, mechanically inaccurate, time-consuming straight-edge method!*

The necessity of tapping, prying and re-adjusting is entirely eliminated! Thousands now in use! Write for complete information and name of your nearest distributor.

U. S. Pat. No. 2,589,865

MAGNA-SET COMPANY Dept. SS
632 NEW HAVEN AVE., MILFORD, CONN.

BOOKBINDING
RUBBER STAMP MAKING
SILK SCREENING

Equipment and Supplies

Free catalog and Education Material for teachers

G. A. PRATT CO.
1108 W. Chicago Ave.,
East Chicago, Ind.

METALWORKING INSTRUCTORS!

Your Students Deserve the Best

• • •

Use Gemaco Metal Working Project Castings

Write for Free Catalog Today!

Gemaco
Box 295 Garden Grove, Calif.

Knockdown Cedar Chests, Veneer Chests and Aromatic Red Cedar Lumber

Students Send $0.25 for Catalog

•

Bedford Lumber Co., Inc.
SHELBYVILLE, TENN.

GIANT BOW COMBINATION SET No. 560

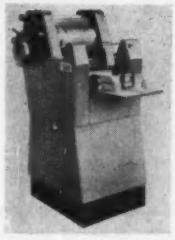
QUALITY ENGINEERED
NET: $4.38
Write For Free Catalog

CENTRAL INSTRUMENT COMPANY
507 Fifth Ave. Dept. 'C' New York 17, N. Y.

hp motors. A 1½-hp enclosed, fan-cooled motor drives a feed mechanism offering speeds from 20 to 100 lineal feet per minute. A box-type, three-point mounted base insures proper support of all components. A 4½", four-knife cutter head is 25" long and knives are easily adjusted by micrometer-type screws, the company reports.

To receive additional information about this new product, *circle no. D-10 on the business-reply card.*

American Type Founders Introduces New Compact Office Duplicator



A new compact duplicator for office and in-plant reproduction centers, the forerunner of a new line of duplicators, was announced recently by American Type Founders.

Called the ATF 1015, it is designed to handle a 10" x 15" sheet size to produce a 9¾" x 13¼" image. Features include friction feeding, chute delivery, and speeds of 3,400 to 7,200 impressions per hour. Simplicity of operation is stressed. All controls are within easy reach. One handle controls application of both dampening and ink form rollers to the plate in proper sequence. Pressures between the blanket and impression cylinders adjust automatically to varying paper weights, the firm reports.

A 12-page booklet describing the ATF Typesetter, a new photo-mechanical system for rapid low-cost composition of text and tabular matter, is available free.

To receive the booklet and for more information, *circle no. D-11 on the business-reply card.*

New PDQ Drafting Portfolio Announced by C-Thru Ruler Company

A new PDQ (Plastic Drafting Quality) unit containing five drawing instruments, a pencil, and a drafting pad in a folding, vinyl portfolio is now being marketed by the C-Thru Company.

The portfolio measures 19" x 13½" when open, and 9½" x 13½" when closed. A 30/60°, and a 45° triangle, a protractor,

SPEEDY-FORGE

Gas-fired;
will use any type gas; manufactured, mixed, natural, bottled, cylinder.

Clean, Fast, Instant Heat
Smokeless
Odorless

No. F-100-A
Blower, Hood, Solenoid Valve

Developed and tested by shop instructors.

Write for sizes and prices on Speedy-Melt Furnaces and Forges.

McENGLEVAN
Heat Treating & Mfg. Co.
708 Griggs **Danville, Ill.**

SHOP COATS
AND SHOP APRONS
rugged . . . low cost

Instructors' coats designed for your comfort, long wear. 2 expertly tailored styles, 5 colors.

Here's low-cost protection for students' clothes... Shop aprons in a choice of colors.

Write for free material samples, low factory-to-you prices!

CAN-PRO Corporation
42 E. McWilliams St. • Fond du Lac, Wis.
Another Subsidiary of J. M. Nash Co., Inc.

NEW! **NOLAN**
SELF-INKING
PROOF PRESS

ELIMINATES GUESS-WORK — SPEEDS PROVING TIME!

clean, sharp impressions every time . . . simple to operate . . . quality NOLAN workmanship and materials

write for full information

NOLAN Corporation ROME, NEW YORK

Enamel powders
Spraying equipment
Hotpack kilns
Enameled tiles
Jewelry kits
Metal shapes
Tools & accessories
Liquid enamels
Firing tools

OF CRAFT SUPPLIES

A complete line of supplies for enameling, ceramics, and other crafts. Order from one source for fast shipment and low price.

Over 200 enamel colors listed, more than 50 jewelry items, an outstanding selection of copper trays, bowls, and free form pieces.

SEND FOR YOUR FREE COPY NOW!

Thomas C. Thompson Co., Dept. SS
1539 Deerfield Road — Highland Park, Ill.

Please send your free catalog of enameling and craft supplies.

Name_____

Address_____

City_____ Zone_____ State_____

NEW CATALOGS

Feature a complete line of school supplies, copper enameling, Mosaics and equipment. FREE to schools and ceramic teachers.

SEELEY'S CERAMIC SERVICE
9 River St., Oneonta, N. Y.

CASTINGS for PROJECTS

to TEACH Metal & Machine Shop Skills at all levels.
Used by over 3000 Schools in 50 States and 7 Foreign Countries.
Send for free Catalog
CASTING SPECIALTIES CO., Cedarburg 6, Wis.

TRANSISTOR RADIO KIT
TWO TRANSISTORS PLUS ONE DIODE
SIMPLE PRINTED CIRCUIT
WHIP ANTENNA AND EARPIECE
BEING USED IN MANY SCHOOLS
PRICE—$2.50 IN QUANTITY, F.O.B. ORANGE, N. J.
DATOM INDUSTRIES INC.
350 Scotland Road Orange, New Jersey

THE "IRON MIKE" CUTS THICKER THAN A DIME!
Portable POWER HACKSAW

Highly Accurate . . . Completely Automatic . . . Low Cost . . . Send for Free Folder.
ARCO MFG. CO.
DEPT. SS, GRAND FORKS, N. DAK.

SCHOLASTIC DRAWING SET NO. 230
WITH STRAIGHTENING DEVICE
NET: $4.10

Write For Free Catalog
CENTRAL INSTRUMENT CO.,
507 Fifth Avenue
New York 17, N.Y.

FREE! NEW! 1962 CATALOG

WAR SURPLUS and other bargains... SAVE up to 90% Bigger and better than ever. Fully illustrated. 1000's of bargains in marine, automotive and aircraft war surplus and other items. You won't want to miss this catalog...it's our greatest! Free if request is on school or commercial stationery (or send 25¢ in coin to cover handling).
AIRBORNE SALES CO., INC. Dept. SS-1261
8501 STELLAR DRIVE • CULVER CITY, CALIFORNIA

motor or vee-belt drive with 5-, 7½-, 10-, 15-French curve, and a 12" calibrated T-square with inch and millimeter scales are contained in individual pockets. One pocket is provided for a drawing pad up to 9" x 12", the company reports.

Complete information may be obtained from *circle no. D-12 on the business-reply card.*

EICO Announces New FM-Multiplex Adaptor and Battery Eliminator and Charger

The Eico Electronic Instrument Co., Inc., recently announced development of the MX-99 multiplex adaptor for improved fm-multiplex reception, and a new low-ripple 6-v and 12-v battery eliminator and charger (No. 1064) for servicing transistorized equipment. Both units are available in kit or factory-wired form.

The adaptor will synchronize with any usable output from the f-m tuner and will demodulate without significant distortion outputs as high as 7-v peak to peak (2.5-v RMS). The battery eliminator and charger delivers the smooth, undistorted dc necessary for servicing transistorized equipment, or for any application where minimum ripple is mandatory, the company claims.

For complete information, *circle no. D-13 on the business-reply card.*

New Literature:

Thermolyne No. 61 is a 44-page catalog illustrating and describing the full line of laboratory and industrial equipment that includes Thermolyne and Temco electric furnaces, hot plates, temperature controllers, pyrometers, and other apparatus. The cover of the catalog carries a temperature conversion table that goes to 9000° F. There is a general introduction to electric furnace operation and control. Copies free on request by *circling no. D-14 on the business-reply card.*

Miniature Power Tools is a five-page Foredom catalog describing four basic miniature power tools and a large selection of miniature handpieces for grinding, drilling, sanding, etc. A copy of the catalog (#210A) is available free by *circling no. D-15 on the business-reply card.*

The Hoffman Padding Press is an illustrated brochure describing a line of padding presses, accessories, and equipment for print shops.

For additional information *circle no. D-16 on the business-reply card.*

Washington . . . *from page 52*

program to train or retrain unemployed persons under the Area Redevelopment Act, approximately 125 persons will be initially enrolled in courses in the Huntington, W. Va., Redevelopment Area. According to the proposal submitted by the Cabell-Wayne County Development Commission, a total of approximately 325 persons will receive training during the current fiscal year, which ends June 30, 1962.

William L. Batt, Jr., Administrator of the Area Redevelopment Administration, a part of the U.S. Department of Commerce, is responsible for general supervision of the Act under which training grants are made. Approval of the Huntington plan carries with it an $85,000 federal grant for the selection and referral of unemployed persons who will be enrolled in these training courses and for the payment of subsistence benefits to them while they are in training. The U.S. Department of Labor is releasing these funds to the West Virginia Department of Employment Security.

Courses authorized initially are automobile mechanic-automatic transmission, small appliance repairman, route salesman, nurses' aide, waiter and waitress, stenographer and typist. Funds in

CREATIVE CRAFTS *and* **COPPER ENAMELING**

92 JAM-PACKED PAGES . . .

Included are dozens of pages of stimulating information and suggestions for creative projects using Tumbled Semi-Precious Gems • Leather • Mosaics • Glass Etch • Reed • Raffia • Raf-Cord • Cork • Metal Tooling & Etching • Gem Craft • AND THE NEWEST CRAFT: U-STAIN GLASS (see our ad on page 44) *If you are not on our mailing list, send for your free catalog today!*

IMMERMAN & SONS
Dept. CH-191 • 1924 Euclid Ave. • Cleveland 13, Ohio

Ceramics-Mosaic Copper Enameling

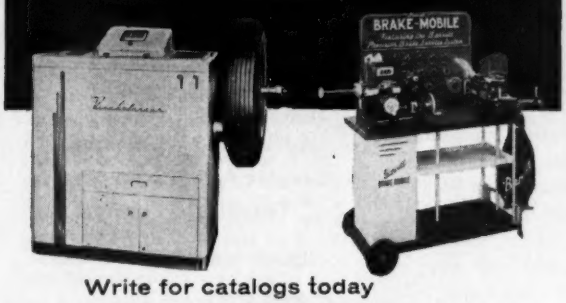
Your complete source of materials and equipment. Fully illustrated. New
#6 INSTRUCTIVE CATALOG
FREE if requested on school letterhead (others 50c)
TEPPING STUDIO SUPPLY CO.
professional staff Dept. BB
3517 Riverside Dr. Dayton 5, Ohio

SHOP TEACHERS
Complete stock of lamp parts for your lamp projects shown in our catalog. Also contains charts and instructions for building and wiring lamps. These valuable instructions and catalog sent for 25c.
GYRO LAMP & SHADE CORP.
R-5208 N.W. 35th Ave. Miami 42, Florida

LUMBER FOR SCHOOLS
Also Plywood and Dowels
Box 336, Paris, Illinois *Established 1887*
T. A. FOLEY LUMBER CO., INC.

You'll find equipment to teach Brake, Front End & Frame Service that exactly meets your needs in the complete

John BEAN Barrett lines



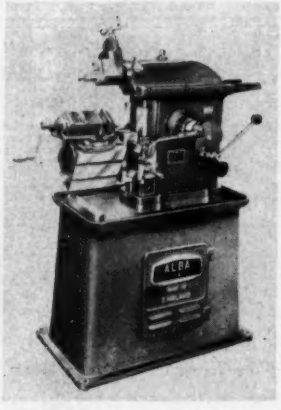
Write for catalogs today

fmc CORPORATION

JOHN BEAN-BARRETT
Auto Service Equipment
® JOHN BEAN DIVISION, Lansing, Mich.

17

Designed for Industry



ELLIOTT
MODEL 1A
10" STROKE

Standard Equipment:

- ¾ H.P. Motor & Controls
- Friction Clutch
- Swivel Table
- Cast Cabinet
- Power Table Feed
- Swivel Vise

All at $995 F.O.B. New Jersey

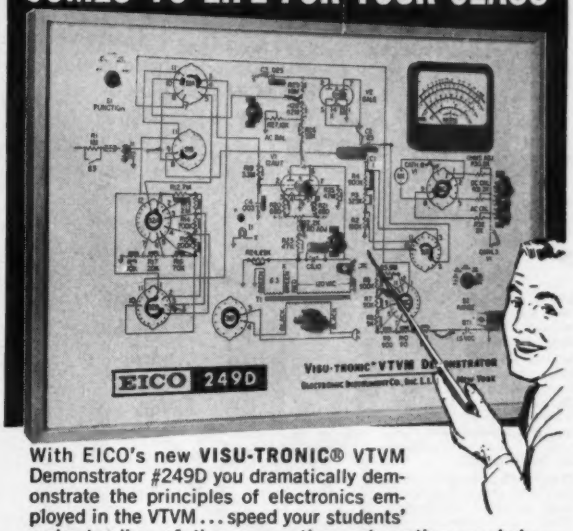
BEST FOR SCHOOLS

Write for Details of Elliott Shaper
12 Models 10" to 30" Stroke

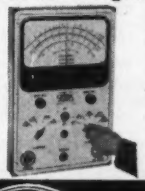
B. Elliott Incorporated • 333 Main Street
Hackensack, New Jersey

EICO VISU-TRONIC® aids for electronic teaching

A TEST INSTRUMENT SCHEMATIC COMES TO LIFE FOR YOUR CLASS

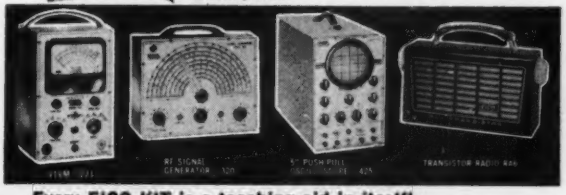


With EICO's new **VISU-TRONIC®** VTVM Demonstrator #249D you dramatically demonstrate the principles of electronics employed in the VTVM . . . speed your students' understanding of theory, practice, schematics, symbols. The #249D includes a complete schematic of EICO's Model 249 VTVM (7½"-meter version of EICO's Model 232) silk-screened on a durable masonite board 27¾" high X 40¾" wide, protected by a clear, transparent plastic coating, **plus** all parts needed to build a complete, working EICO Model 249, (including EICO's exclusive UNI-PROBE® in kit form). Components snap in and out quickly and easily with the spring-type clips incorporated in the board enabling you to remove components or substitute components of different values. 17 parts of the circuit can be disabled, to help teach troubleshooting, and illustrate basic principles of electronics. The completed schematic is 3½ inches deep, and can either be hung on the wall with the special metal wall mounts provided, or stand on desk or table on its own two swingout legs. **Price $89.95**



Another great EICO teaching aid—
the VTVM Dynamic Demonstrator

Two-and-a-half times as big as life! Helps you teach the meaning and function of the VTVM. Realistically reproduces front panel of VTVM with a 13" meter scale. Simulates all functions and ranges—movable dial controlled by knobs that click convincingly when turned. $10.00



Every EICO KIT is a teaching aid in itself!

Building fine, professional EICO KITS, test equipment, hi-fi, amateur gear, citizens transceivers, transistor radios—with their advanced circuitry and hand-wiring throughout, gives your students deepened understanding of electronics. Performance-proved by 100,000 students.

VTVM #221	**Kit $25.95**	**Wired $39.95**
RF Signal Generator #320	**Kit $19.95**	**Wired $29.95**
5" Push-Pull Oscilloscope #425	**Kit $44.95**	**Wired $79.95**
Transistor Radio RA-6	**Kit $29.95**	**Wired $49.95**

Add 5% in the West

EICO®
3300 N. Blvd.
L.I.C. 4, N. Y.
Export Dept.,
Roburn Agencies,
431 Greenwich St.,
N. Y. 13, N. Y.

PLEASE SEND FREE **SS-12**

- ☐ ELECTRONICS WALL CHART of official IRE-EIA Symbols
- ☐ Stereo-Hi-Fi Guide ☐ Short Course for Novice License
- ☐ Schematic of Model #_____
- ☐ EICO catalog, and name of neighborhood supplier

Name .....

Address .....

City ..... State .....

AJUSTRITE CHAIRS AND STOOLS

LABORATORY AND SHOP STOOLS

- Adjusts to fit any student
- No soiled hands when adjusting seat

Model S-1827 has 13" diameter steel seat. Seat adjusts from 18" to 27". Steel glides.

Model RSS-2230 has 16" diam. tubular steel footring welded to base. 13" diam. steel seat adjusts from 22" to 30". Casters, backrest, wood seat, seat pad or cushion available for both models.

FREE TRIAL Use an AJUSTRITE chair or stool for 30 days without obligation. Prove to yourself the many advantages AJUSTRITE offers in comfort, utility and economy. Write today—we'll do the rest.

10 YEAR GUARANTEE

If Models for Factories • Schools • Laboratories • Hospitals • Offices

AJUSTO EQUIPMENT CO.
515 CONNEAUT ST. • BOWLING GREEN, OHIO

SPECIAL! **30% EDUCATIONAL DISCOUNT**

Trindl "JOB TESTED"

ARC WELDERS

MODEL 125A 115/230V AC $98.50 Less Discount F.O.B.

MAKES TEACHING EASIER

Hold student interest through work satisfaction and professional welding results. Develop student skills with the finest equipment industry has to offer. The TRINDL 125 Amp. Arc Welder is portable and ideal for all school training shops. Complete with electrode holder, cables, helmet, power cord and plug, assorted electrodes and flux. **GUARANTEED FOR ONE FULL YEAR IN CONTINUOUS OPERATION.** Order from this ad or write Dept. T96N for free details and literature.

MODEL 125A
115/230 VOLTS AC
Handles rods from 1/16" to 5/32" on stock to 1/2" thick. 16 heat stages range from 20 to 125 Amps. America's finest low-priced fastest selling Welder. List price complete with all accessories only ~~$98.50~~.

TRINDL PRODUCTS, Ltd.
Manufacturers of: Welders—Pipe Thawers—Welding Accessories and Supplies
1807 S. CLARK ST., CHICAGO 16, ILL.

the amount of $50,000 for the Huntington Board of Education to carry on these training courses in the Huntington East Trade School are being paid by the U.S. Department of Health, Education, and Welfare to the West Virginia Board for Vocational Education.

The funds for training and retraining in redevelopment areas include $10 million for subsistence to unemployed or underemployed trainees and $4 million for training activities, including surveys of manpower and skill needs, testing, counseling, selection and referrals, and costs of instruction.

Secretary of Labor Arthur Goldberg said:

"Although the number of persons who can be retrained under the Redevelopment Act is limited by the amount of funds authorized by the Act, I regard this program as a valuable forerunner to the larger training program proposed by the Kennedy Administration in the Manpower Development and Training Act. Through this bill did not come to a final vote in the Congressional session which just closed, I feel confident it will become law in the next session. Meantime, we will make every effort to train the maximum number of unemployed persons under existing law.

"The initiative for retraining programs under this Act must come from the redevelopment areas themselves and should be keyed to their economic development plans," the Secretary explained. "The Department of Labor and its affiliated State Employment Security Agencies, which will select and refer the unemployed for training and pay their retraining benefits through the local employment offices, stand ready to help any eligible area appraise its training needs and develop suitable training plans."

Educational Opportunity.—The U.S. Commission on Civil Rights has called on Congress and the President to "Take appropriate measures to encourage the fullest utilization of the nation's manpower resources and to eliminate the waste of human resources inherent in the discriminatory denial of training and employment opportunities to minority group members."

"Appropriate measures" recommended by the Commission include changes in the policies and practices of vocational education and apprenticeship training programs, as well as the federal government, trade unions, and public employment services. The life of the five-man Commission, which can only investigate, recommend, and publicize, was recently extended for two years by Congress.

12,000 creative products for

Sign Making | Display
Advertising | Lettering
Graphic Arts | Screening
Teaching | Printing

GIANT 248 PAGE CATALOG

FREE! *to accredited users.*

Order from
DICK BLICK
GALESBURG, ILLINOIS

$10.95 COMPLETE

COLOR DIAL TELEPHONES

Factory rebuilt Western Electric in white, beige, ivory, pink, green or blue. If 4 prong plug is required add $2.00. Fully guaranteed. *Write for free list. All shipments F.O.B.*

SURPLUS SAVING CENTER
Waymart Dept. 12Z1 Penna.

New BIG 4½" CORNER CLAMP

$3.89 Postpaid

Ideal for making picture frames, screens, storm sash and furniture joints. Permits user to cut or correct errors occurring in 45° mitered corner cuts.

GUNVER MFG. CO., Dept. SS, Manchester, Conn.

New Binder for School Shop

- √ Holds 10 issues of School Shop.
- √ Easy to add new copies.
- √ Soil-resistant blue imitation leather.
- √ Copies lie flat and open for easy reference.
- √ School Shop embossed in gold on front and backbone.

Order Yours Today $2.50 Plus Shipping

Prakken Publications, Ann Arbor, Mich. M
Please send me____(no.) School Shop Binders.

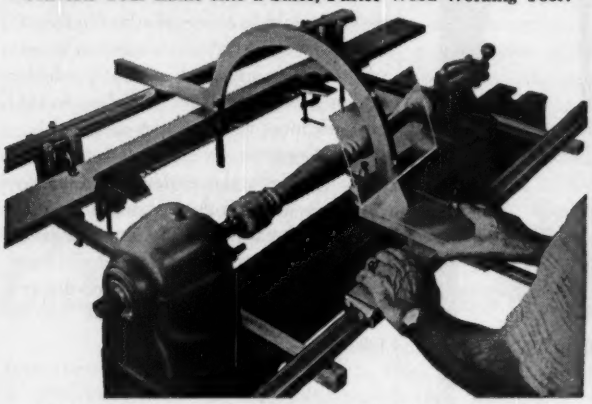
☐ Please bill. ☐ Money enclosed.

Name_____

Address_____

THE AMAZING GIZ...

Converts Your Lathe Into a Safer, Faster Wood Working Tool!



The first major improvement in wood-turning since the invention of the lathe, the GIZ adapts to all wood-turning lathes . . . eliminates old-fashioned tool rests and dangerous chisels!

MORE SCHOOLS are adopting the GIZ as STANDARD EQUIPMENT.
MORE STUDENTS do a BETTER JOB thanks to GIZ's EXACT DUPLICATION.
MORE PARENTS are BETTER PLEASED with GIZ "take-home" projects.
MORE SCHOOL BOARDS recognize the true GIZ SAFETY FACTOR.
All these trends back up our GUARANTEE OF SATISFACTION ON EVERY SALE. You **must** do a BETTER JOB WITH MORE SAFETY using the GIZ!

For more information, see your local dealer or write:

GIZCO

P. O. Box 1103
Perry Annex
Whittier, Calif.

T-square-rule

of HARD ALUMINUM

24" T-SQUARE
NO. 024-T
ONLY
$2.49

- LIGHT-STRONG
- RESILIENT
- DURABLE
- GRADUATED

FAIRGATE

SEND FOR CATALOG

FAIRGATE RULE CO., INC.
COLD SPRING 17, NEW YORK

SIMPLY INTERCHANGE TIPS FOR

3 SOLDERING TEMPERATURES

Interchangeable Magnastat tips are available in 3 temperature ranges: 750°F., 700°F., 600°F. controlled to ±3% approximate variance.

Weller MAGNASTAT®
Controlled Temperature Soldering Irons

Automatically maintain correct soldering temperature. Never overheat or underheat. Weigh only half as much as uncontrolled irons. Give greater heat efficiency with lower wattage. Handle stays cool. Over 40 tip types available.

3 MODELS WITH 2 OR 3-WIRE CORDS

Model TC-552 — 55 watts— **$ 9.00** list
Model TC-602 — 75 watts— **$10.00** list
Model TC-1202— 120 watts— **$11.50** list

Prices shown are for Magnastat Iron with tip and 2-wire cord.

Send for NEW literature on
Weller MAGNASTAT Soldering Irons

WELLER ELECTRIC CORP. 801 Stone's Crossing Road Easton, Pa.

Craftsman's New Catalog FREE to Instructors

Fine Domestic and Imported **WOOD**
POWER TOOLS, HARDWARE, KITS
WORKSHOP SUPPLIES, EQUIPMENT

- ✔ 140 PAGES . . . many in full color . . . newest project ideas.
- ✔ Embossed mouldings, curved ornaments, and matched plywoods and veneers.
- ✔ Complete lines of archery and upholstering supplies.
- ✔ New! Blanks for baseball bats, snowskis, complete water ski kit.
- ✔ New! Clock Kits, Swiss Music Movements, Hi-Fi Cabinet Woods.
- ✔ New wood grain *Plastic* legs—all sizes!

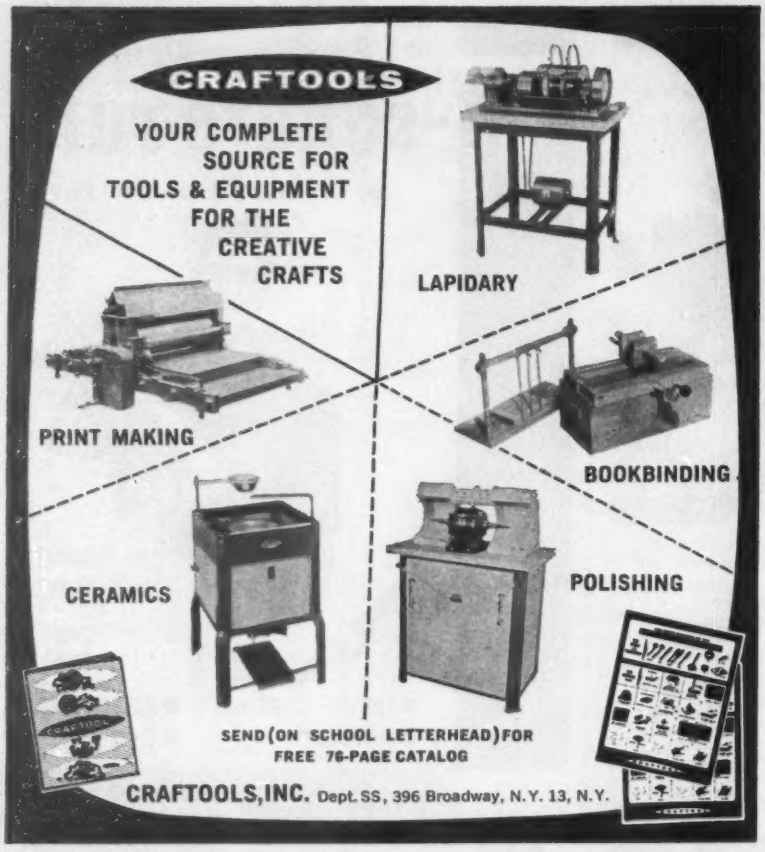
CRAFTSMAN WOOD SERVICE CO.
2729 S. Mary St., Dept. K-12
Chicago 8, Illinois

1962 Edition — New Low Prices

INSTRUCTORS! Just mail coupon for your FREE COPY (25c to students) of our giant new 1962 woodworking catalog. We are America's largest source of fine domestic and rare imported woods for projects. Also bandings, veneers, inlays . . . all shown in full color. See newest tools, equipment and hard-to-find cabinet hardware. Rush your request today!

CRAFTSMAN WOOD SERVICE CO., Dept. K-12
2729 S. Mary Street, Chicago 8, Ill.
Send new CRAFTSMAN WOODWORKER'S CATALOG—FREE (enclose 25c if student).

Name .....
Address .....
City ..... Zone ..... State .....



Tells how you can safely

SURFACE HARDEN

Low-Carbon Steel Parts and Tools

WITHOUT SPECIAL EQUIPMENT

Write today for our booklet on "How to use KASENIT CASE HARDENING COMPOUNDS"

Kasenit, used in shops throughout the country, is non-toxic, non-inflammable, non-explosive.

For your free booklet or for Kasenit Compound see your supplier or write directly to . . .

KĀSENIT COMPANY
12 KING STREET, MAHWAH, N. J.

NEW!

MITRE MASTER
ADJUSTABLE MITRE VISE

As versatile as your two hands. Holds anything at any angle. Helps make angular assemblies easy. Holds parts to be welded, nailed, glued, or soldered. A great aid in fabricating, assembling and machining metals, wood, and plastic. Write for circular.

NEW! **$5.95**

ABERNATHY VISE & TOOL CO.
136 W. HOME AVENUE
VILLA PARK ILLINOIS

Equal educational opportunity is placed ahead of equal employment opportunity by the Commission. ". . .Even if employment opportunities were made available to Negroes, their occupational status would not be greatly improved," its report states. "Discrimination in education, training, and referral, whether by employment offices or labor organizations, must first be overcome."

The Commission concluded, therefore. that, "Unless the federal government takes an active role in providing vocational education and apprenticeship training on a nondiscriminatory basis. Negroes will continue to suffer the economic and legal deprivations of the past.

"When new opportunities in training or employment are made available to Negroes, there is often a dearth of qualified Negro applicants," the Commission acknowledged. "Part of the problem is a lack of applicants resulting from the unwillingness of many Negroes to apply for jobs that have traditionally been closed to them or a lack of knowledge of such new openings. Another facet of the problem is a lack of adequately trained Negroes resulting from a shortage of training opportunities or lack of motivation on the part of Negroes to take training for jobs that may not be available to them."

The Commission's report singled out for criticism the requirement of the U.S. Office of Education that admission to vocational classes, as well as distributive and part-time courses, hinges on the student's "current employment" or "chances of securing employment."

"Training opportunities for Negroes, limited to training for jobs currently available in the community rather than for future employment opportunities or opportunities in other communities, may be determined to a large extent by discriminatory hiring and referral practices of local employers and labor unions," the report states. "Moreover, the jobs traditionally open to Negroes are generally the ones in which there is a growing surplus of labor. In the newer technical skills, on the other hand, where training is not generally available to Negroes, openings for qualified applicants are constantly increasing."

Recommendations of the Commission include action by Congress and the President to:

1. Expand and supplement existing programs of federal assistance to vocational education and apprenticeship training;

2. Provide that, as a condition of fed-

eral assistance, all such programs be administered on a nondiscriminatory, nonsegregated basis; and

3. Amend present regulations regarding admission to vocational classes to provide that admission be based on present and probable future national occupational needs rather than, as presently interpreted, on traditional and local needs and opportunities.

By implication, the Commission's recommendations supported continuance of training and retraining programs under the Area Redevelopment Act and enactment by Congress of the Manpower Development and Youth Employment Services Bills. In the opinion of the Commission, the latter legislation should include "provision of funds for special placement services in the schools in connection with part-time and cooperative vocational education programs."

Copies of *Employment, Book 3 of the 1961 U.S. Commission on Civil Rights Report* may be obtained from the Superintendent of Documents, U.S. Printing Office, Washington 25, D.C. The price has not yet been fixed. ★

Index TO ADVERTISERS . . .

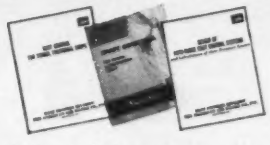
Please note: For further information from advertisers, circle the "Number to circle on the card" adjacent to those companies listed below from whom you wish product information. Card is on next page.

No. to Circle on card		Page No.
1	Abernathy Vise & Tool Co.	50
2	Airborne Sales Co.	46
3	Ajusto Equipment Co.	48
4	Allied Radio Corp.	28
5	American Abrasive Metals Co.	42
6	American Air Filter Co.	51
7	American Electrical Heater Co.	4
8	American Technical Society	2
9	Arco Mfg. Co.	46
10	Armstrong Bros. Tool Co.	41
11	Atlas Press Co.	19
62	Baldor Electric Co.	43
12	John Bean Division	47
13	Bedford Lumber Co.	45
14	Benchmaster Mfg. Co.	31
15	Beverly Mfg. Co.	31
31	Billings & Spencer Co.	31
17	Dick Blick	48
18	Boice-Crane Co.	30
19	Brodhead-Garrett Co.	22
20	Buck Engineering Co.	25
21	Can-Pro Corp.	45
22	Casting Specialties Co.	46
23	Central Instrument Co.	45, 46
24	Central Tool Co.	31
25	Champion Pneumatic Machinery Co.	21
26	Cincinnati Tool Co.	41
27	Craft Metals Corp.	40
28	Craftools, Inc.	50
29	Craftsman Wood Service Co.	49
30	Datom Industries	46
31	Delta Power Tool Div., Rockwell Mfg. Co.	Cov. 3
32	Di-Acro Corp.	29
33	DenJer Products Co.	43
34	Dowl-It Co.	44
35	Dreis & Krump Mfg. Co.	39
36	Educational Lumber Co.	28
37	EICO	47
38	Electronic Teaching Laboratories	32
39	B. Elliott, Inc.	47
40	Fairgate Rule Co.	49
41	Foley Lumber Co.	46
42	Foley Mfg. Co.	37
43	Garrett Tubular Products, Inc.	18
44	Gearon Co.	40
45	Gemaco	45
46	General Scientific Eqpt. Co.	18
47	Gilbert & Miller, Inc.	44
48	Giles & Kendall Co.	43
49	Gizco	49
50	Goodheart-Willcox Co.	3
51	Gunver Mfg. Co.	48
52	Gyro Lamp & Shade Corp.	46
53	Immerman and Sons	44, 46
54	Irwin Auger Bit Co.	4
55	Karle Spin-Shop Co.	44
56	Kasenit Co.	50
57	Leeds Sweete Products Inc.	43
58	Logan Engineering Co.	20
59	Magna-Set Co.	45
60	McEnglevan Heat Treating & Mfg. Co.	45
61	McKnight & McKnight	39
63	Modern School Supplies	48
64	Nolan Corp.	45
65	Northfield Foundry & Machine Co.	Cov. 2
66	Old Pioneer Archery	31
67	Parent Metal Products, Inc.	31
68	Parker Mfg. Co.	44
69	Parks Woodworking Machine Co.	41
70	Patterson Bros.	41
71	Paulson Mfg. Corp.	44
72	Peck, Stow & Wilcox Co.	41
73	Plastic Products Co.	43
74	Frederick Post Co.	5
75	Powermatic Machine Co.	8
76	G. A. Pratt Co.	45
77	Projection Optics Co.	37
78	Rapidesign, Inc.	36
79	Reproduction Engineering Corp.	36
80	Royalle Publishing Co.	40
81	Sax Brothers, Inc.	44
82	Science Electronics, Inc.	52
83	Seeleys Ceramic Service	46
84	Sheldon Machine Co.	24
85	Skil Corp.	29
86	South Bend Lathe, Inc.	7
87	Stanley Tools	39
88	L. S. Starrett Co.	Cov. 4
89	Surplus Saving Center	48
90	Tepping Studio Supply Co.	45
91	George S. Thompson Corp.	44
92	Thomas C. Thompson Co.	46
93	Thompson Ramo Woolridge	26, 27
94	Torit Mfg. Co.	18
95	Trindl Mfg. Co.	48
96	Universal Scientific Co.	38
97	Weller Electric Corp.	49
98	Wells Mfg. Corp.	23
100	Wilkenson Mfg. Co.	43
99	Wilton Tool Mfg. Co.	6

WHY MORE THAN 1000 SCHOOL SHOPS CHOSE AAF DUST CONTROL

AAF equipment has been installed by more than a thousand schools to assure clean, dust-free air for their vocational shops. If you are interested in complete information on school shop dust control, you'll find AAF's new fact file and movie quite informative. Send for either (or both) of these packages today . . . they're FREE.

1 Complete file on dust control in the school shop



Packed with information on how to provide dust-free air for students and maintain highest standards of shop cleanliness. Includes facts on designing effective dust control systems, and a complete description of AAF units most widely used in school shop service. Use the coupon below to order your Dust Control File.

2 15-minute movie "Dust Control in Vocational Arts"

Book this movie now for a free showing. Prepared especially for school boards, PTA's, education departments, and school architects and engineers, the film visually presents the advantages of effective dust control in the school shop. Available now for showing by any group.

American Air Filter Co., Inc.
216 Central Avenue, Louisville 8, Ky.
Please send me:

☐ 1. Free Dust Control File
☐ 2. 15-minute Sound Movie (at no cost except return postage)

Name_____
Title_____
Address_____
City_____
State_____

SPEED UP TECHNICIAN TRAINING WITH NEW *ERECTRONIC*® SYSTEM KIT BE-7 AND EIA MANUAL

New ERECTRONIC Kit provides all components mounted on plastic bases with patented jiffy connectors for pegboard breadboarding of thirty-nine experiments.

Used with "Industrial Electronics" manual developed by EIA (Electronic Industries Association), the student quickly gains an understanding of basic circuits and their application.

The "Industrial Electronics" course covers:

- Computers
- Thyratrons and Thyratron Control
- Time Constants
- Vacuum Tube and Transistor Time-Delay Relays
- Photo-Electric Control
- Phototransistor Relays
- Saturable Reactor
- Peaking Transformer
- Motor Control
- Regulated Power Supplies
- Radio and Tone Control Systems
- Gaseous Rectifiers
- Synchros
- Servo-mechanisms

Write for Technical Data on the new ERECTRONIC Kit BE-7

SCIENCE ELECTRONICS, INC.

195 Massachusetts Avenue, Cambridge 39, Mass.

a subsidiary of

GENERAL ELECTRONIC LABORATORIES, INC.

AVA CONVENTION BOOTHS 62 and 63

from Washington

by Theodor Schuchat

President's Panel.—President Kennedy has appointed a panel of 26 citizens drawn from education, government, industry, labor, and agriculture "to review and evaluate the National Vocational Education Act and make recommendations for improving and redirecting the program."

Organization of the panel was originally announced by the President in his special message to Congress on education soon after taking office last winter. Noting that "the technological changes which have occurred in all occupations call for a review and re-evaluation," he directed HEW Secretary Ribicoff "to convene an advisory body. . . ."

Chairman of the President's panel will be Benjamin C. Willis, superintendent of schools, Chicago, Illinois. Other members of the panel are:

Mrs. Mary Caperton Bingham, Louisville, Ky.; Hyman H. Bookbinder, special assistant to the Secretary of Commerce, Washington, D.C.; Charles F. Carroll, superintendent of public instruction, state department of public instruction, Raleigh, N.C.; Frederick T. Corleto, Corleto Buick Agency, Inc., South Philadelphia, Pa.; Ernest H. Dean, Speaker of the House of Representatives of the State of Utah, Salt Lake City, Utah;

Mark Ellingson, president, Rochester Institute of Technology, Rochester, N.Y.; Margaret C. Ells, American International College, Springfield, Mass.; Charles W. Engelhard, Jr., chairman of the board, Engelhard Industries, Newark, N.J.; Edward B. Evans, president, Prairie View Agricultural and Mechanical College, Prairie View, Tex.; Henry A. Gonzales, state supervisor of trade and industrial education, Santa Fe, N.M.;

Francis A. Gregory, assistant superintendent and director of vocational education, District of Columbia Schools, Washington, D.C.; Jerry R. Holleman, Assistant Secretary of Labor, Washington, D.C.; Floyd D. Johnson, teacher of vocational agriculture, York, S.C.; Dr. Helen R. Le Baron, Dean, College of Home Economics, Iowa State University, Ames, Iowa; William B. Logan, director of distributive education and Professor of Education, Ohio State University, Columbus, O.;

Charles O'Dell, Assistant Director of Retired Workers' Department of the International Union of the United Auto Workers, Detroit, Mich.; James Patton, president, National Farmers Union, Denver, Colo.; J. B. Perky, director of vocational education, state department of education, Stillwater, Okla.; Thomas H. Quigley, Professor and Head, department of trade and industrial education, engineering extension division, Georgia Institute of Technology, Atlanta, Ga.; Mrs. Helen Radke, member of Port Angeles public school board (and Member of State Board of Education), Port Angeles, Wash.;

Peter T. Schoemann, president, United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry, Washington, D.C.; Theodore Schultz, chairman, department of economics, University of Chicago, Chicago, Ill.; Paul Sheats, director of extension and adult education, University of California, Los Angeles, Calif.; Dael Wolfle, executive officer, American Association for the Advancement of Science, Washington, D.C.; and E. T. York, director of federal extension Service, Department of Agriculture, Washington, D.C.

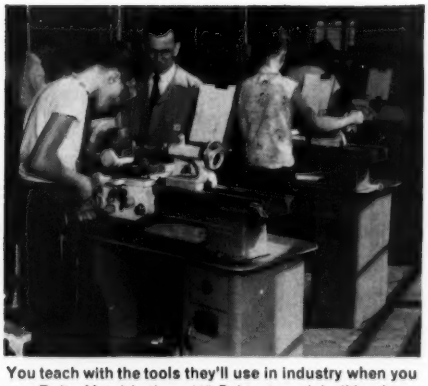
The panel held a three-day organizational meeting in Washington early last month. The USOE's Division of Vocational Education will supply staff services to the panel through a special five-man staff. The panel is expected to place its report and recommendations before Congress in January 1963.

President Kennedy's views on vocational education were expressed most clearly in a public statement issued on October 16, 1960, when he was a candidate for his present office: ". . .I am in favor of continuing the appropriation of federal funds for vocational education at the full amounts authorized under the various vocational education acts, and, where justified, I am in favor of expanding vocational education on a grant-in-aid basis, to be administered by state boards for vocational education."

ARA Starts Retraining.—In the first

(*Continued on page* 46)

DELTA Metal Lathes help you do more— with added safety, extra capacity



You teach with the tools they'll use in industry when you use Delta Metal Lathes. 11" Cabinet models (like those shown above) are used extensively in tool rooms and precision experimental work in metalworking shops across the country.

You can choose any model of Delta's famous 10" metal cutting lathe, the new 'Long Bed' 10" lathe (with a big 36" capacity between centers) or the husky 11" lathe to help you meet your particular school shop needs. Every one is engineered to give you an exclusive combination of features that make it the big value in its class.

You'll recognize the teaching advantages of variable speed drive, quick change gear box and the extra big collet capacity. And you'll appreciate the two new safety accessories for all Delta 10" lathes: Mechanical Back Gear Lock-out Kit and Magnetic Starter Electrical Disconnect Switch Kit. Used together, these guard students from moving gears and guard against damage to the machine. For back gear operation, student must release the lock-out mechanism. To do this, the headstock cover must be raised—this action shuts off the motor automatically.

Call or visit your Delta Industrial Distributor (listed under "TOOLS" or "MACHINERY" in the Yellow Pages) for a demonstration of the many quality features these lathes offer to help your students learn operating techniques quickly, safely and easily.

Visit us in Booth 112 at the AVA Exhibition in Kansas City, Mo.

FREE CATALOG

Complete specifications on the entire line of Delta Metal Lathes and full range of accessories. Write: Rockwell Manufacturing Company, Delta Power Tool Division, 412-M North Lexington Ave., Pittsburgh 8, Pa.

DELTA INDUSTRIAL TOOLS

another fine product by

ROCKWELL

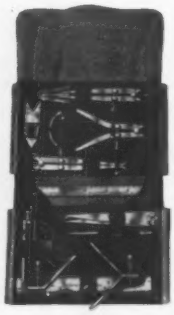
Starrett® tools

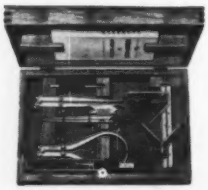
that help your boys make faster progress on precision work

Starrett makes tools for the student and apprentice as well as for the finished craftsman. Here are some of the more than 3000 items shown in the big new Starrett Catalog No. 27. Send for your free copy.

SET OF TOOLS NO. 900

Eight basic tools in a black leatherette case: 6″ combination square with center head; 6″ rule with pocket case and clip; center punch; center gage; 4″ inside, outside and hermaphrodite calipers; 4″ dividers.



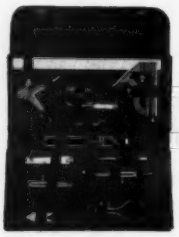


SET OF TOOLS NO. 901

Similar to Set No. 900 except tools are furnished in strong, attractively finished wood case plus a copy of "The Starrett Book for Student Machinists."

SETS OF TOOLS NO. 902 SERIES

More complete sets in durable, folding, artificial leather cases. No. 902A has 9″ square; No. 902B 12″ square plus 1″ micrometer, center gage, center punch, 6″ rule, 4″ inside and outside calipers, dividers and hermaphrodite calipers.



NO. 22C 59 DEGREE DRILL POINT GAGE

Measures drill lip lengths and insures correct 59° point angles for best cutting. Also serves as plain rule, hook rule, depth gage, try square and slide caliper.

"SATIN CHROME" STEEL RULES

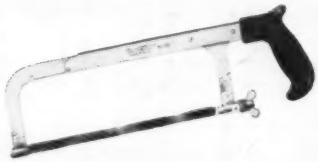
Flexible and spring tempered types, 6, 12, 18 and 24-inch lengths, fractional or decimal graduations. Easy to read with long wearing, no-glare Satin Chrome Finish (pioneered by Starrett).

Other Useful Dependable STARRETT TOOLS

No. 436 Outside Micrometer Caliper, one inch
No. 124A Inside Micrometer
No. 11 Combination Square, 12 inch
No. 1010 Dial Indicator Pocket Gage
No. 815 Toolmakers' Hammer
No. 86A Combination Hand Vise
No. 596 Pencil Divider
No. 54 Hold Downs
No. 196A Universal Dial Test Indicator
No. 29 Scratch Gage
No. 56A Toolmakers' Surface Gage
No. 172A Thickness Gage
No. 70A Pocket Scribers
No. 500 Steel Pocket Tape, 72 inch
No. 530 Steel Case Tape
No. 711F "Last Word" Dial Test Indicator
No. 50A Improved Trammels
No. 93A T-Handle Tap Wrench
No. 132 Bench Level, six inch
No. 129 Bench Block
No. 236H Depth and Angle Gage
No. 135 Pocket Level
No. 165 Double End Pin Vises
No. 166 Pin Vises
No. 579 Telescoping Gages
No. 185 Tap and Drill Gage
No. 187 Jobbers' Drill Gage
No. 167 Radius Gages
No. 829 Small Hole Gages
No. 555 Jewelers' Screw Drivers
No. 6 Screw Pitch Gage
Kleenscribe Layout Dye
Starrett Tool and Instrument Oil

NEW HIGH SPEED WELDED EDGE HOLE SAWS

Double welded and shatterproof. For cutting clean, round holes in any machineable material. Sizes from 9/16″ through 6″ diameter.



NO. 153 HACKSAW FRAME

Adjustable for 8, 10 or 12-inch blades. Sturdy satin finish frame with tough rubber pistol grip. An ideal frame for use with Starrett hand hacksaw blades.

FREE EDUCATIONAL AIDS

New Bulletin 1203, "How to Read, Use, Care for Micrometers and Vernier Gages." Also, Training Aids Bulletin No. 1202 which shows the many Starrett training aids available free or at small cost. Write for your free copies. Address Dept. SS, The L. S. Starrett Company, Athol, Massachusetts, U.S.A.

Buy THROUGH YOUR INDUSTRIAL DISTRIBUTOR — Prompt delivery · Dependable service · Quality products

Starrett

SINCE 1880
WORLD'S GREATEST TOOLMAKERS

HAND MEASURING TOOLS AND PRECISION INSTRUMENTS
DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK
HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES